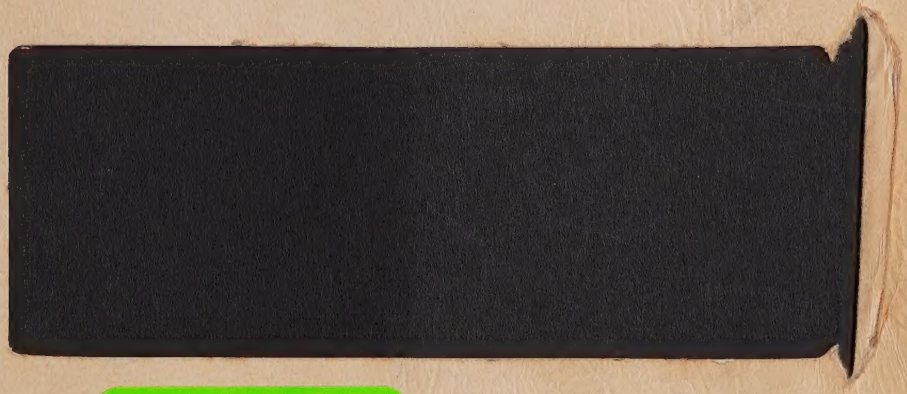
OPERATION
AND
SERVICE MANUAL



MP MASTER
MA24061

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OPERATION
AND
SERVICE MANUAL
NO. 490270

MODEL 1205/1205A SWEEP SIGNAL GENERATOR

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MODEL 1205A

INSTRUCTION MANUAL DIFFERENCE SHEET

This difference sheet applies to those Model 1205 Sweep Generators with the rotary attenuators instead of the slide switch attenuators.

CHANGES:

A. Specification changes

2.9	RF Attenuator	110dB in 1dB steps, 3dB continuous variable.

B. Refer to Appendix A for changes to operating instruction, assembly drawings and schematics.

APPENDIX "A"

TABLE OF CONTENTS

1.0 Changes to operating instructions.

2.0 Assembly drawings, parts lists and schematic diagrams.

1.0 Changes to operating instructions.

1.1 Except for the changes shown below, the operation of the 1205A is identical to the 1205.

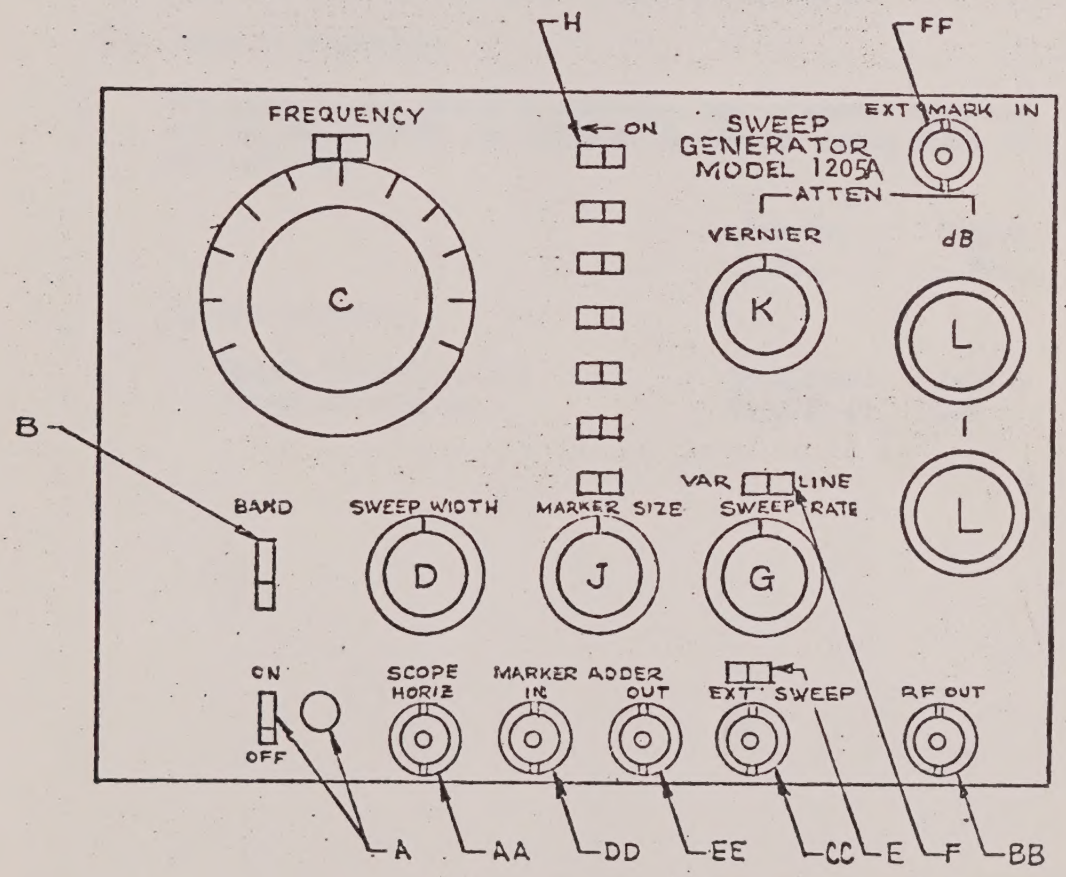

Figure 1.1

Front Panel Control Locations

L. ATTENUATOR Controls — These two controls attenuate the RF output by the amount shown, up to 110dB in 1dB steps.

2.0 ASSEMBLY DRAWINGS, PARTS LISTS, AND SCHEMATIC DIAGRAMS:

2.1 General

Assembly drawings, parts lists and schematic diagrams are contained in this section for those repairable sub-assemblies which are unique to the Model 1205A.

Figure 2-1 is the assembly "tree" for the 1205A.

2.2 Index of Assemblies

The parts lists, assembly drawings, and schematic diagrams for the Model 1205A are included in the following order in this section.

	Drawing No.	Figure No.
Monitor Assembly		
Module Assembly & P/L	95-0321-01	2-2A,B
Schematic Diagram	54-0321-01	2-3

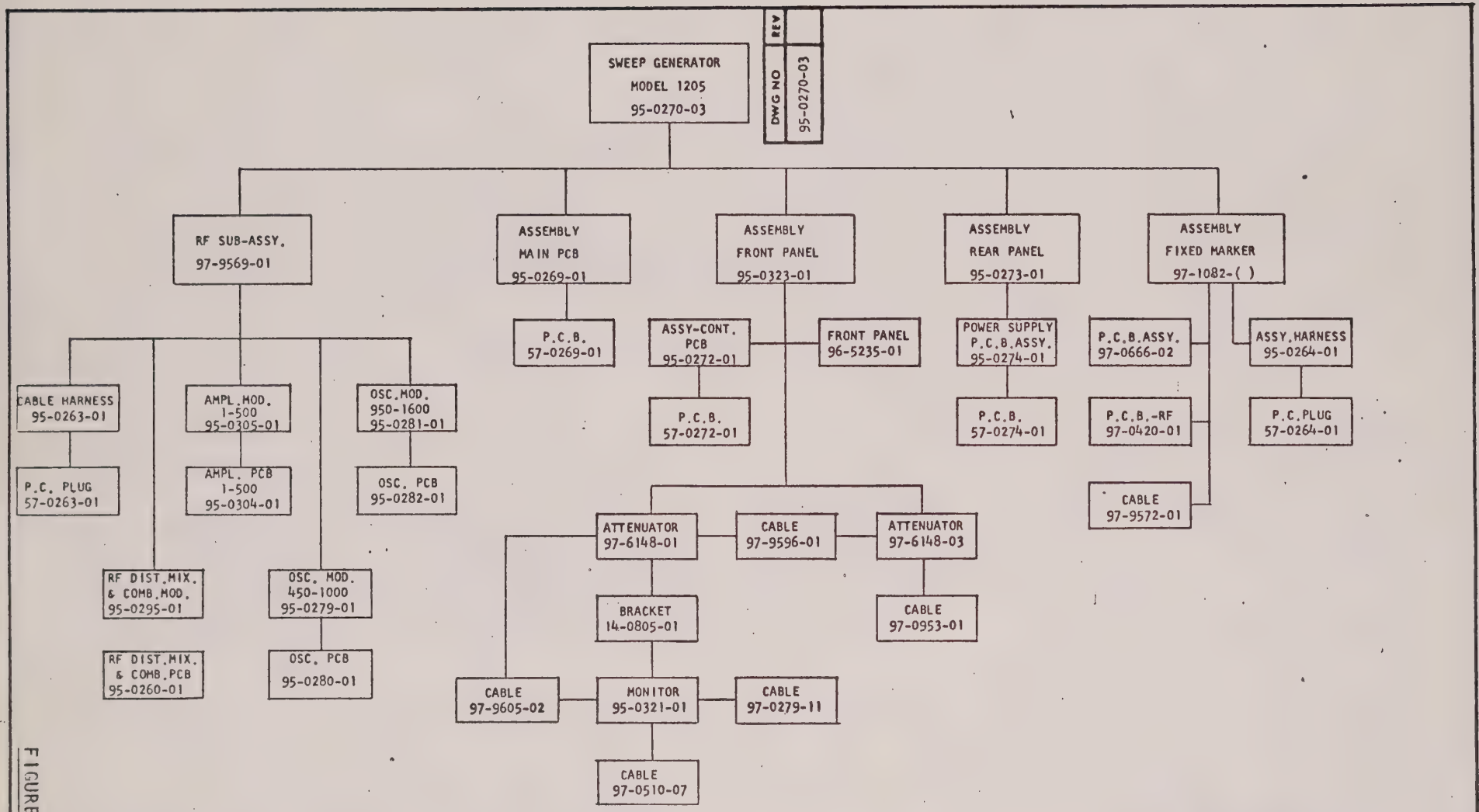

FIGURE 2-1

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	D.STEADMAN	11:30:72
.XX ±.01	CHK		
.XXX ±.005	ENGR	P. L. Kirst	11-30-72
ANG. ± 1°	APVD		

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LET	REVISION	DATE

TITLE: ASSY, SWEEP GENERATOR
MODEL 1205/W ROTARY ATTENS.

SH 2 OF 3	SIZE	DWG NO	REV
REL	B	95-0270-03	

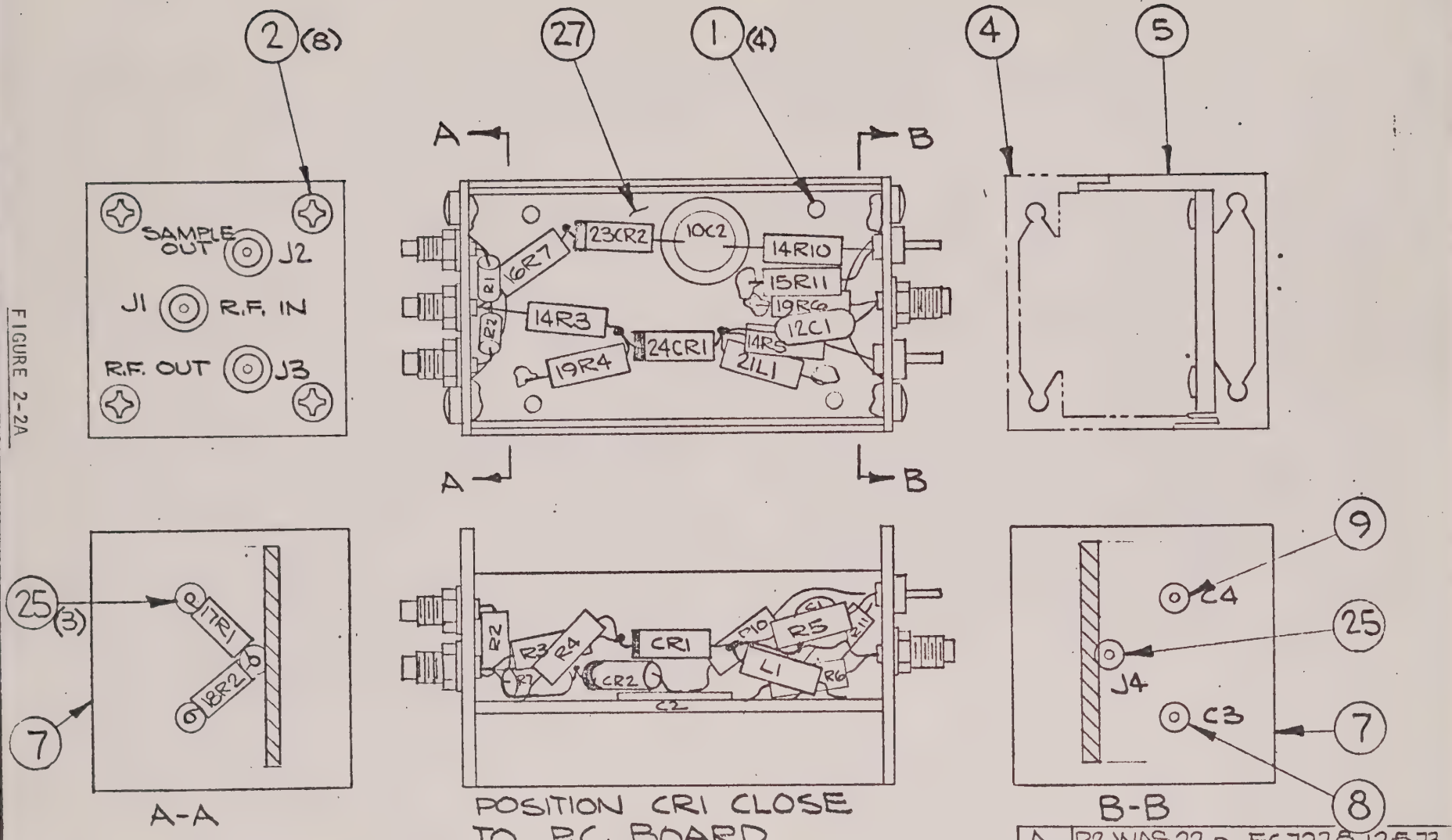

FIGURE 2-2A

LET	REVISION	DATE
A	R2 WAS 22Ω EC7228	2-5-73

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	D. STEADMAN	11-6-72
.XX ± .01	CHK		
.XXX ± .005	ENGR	R.L. KING	11-6-72
ANG. ± 1°	APVD		

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TITLE			
ASS'Y, MONITOR 1200 SERIES			
SH 1 OF 2	SIZE	DWG NO	REV
REL	A	95-0321-01	A

1-7228

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	02-7102-02	4	Screw, #2-56 x 1/8 lg.	
2	02-7004-04	8	Screw, #4-40 x 1/4 lg.	
3				
4	13-0624-01	1	Cover	
5	13-0624-02	1	Module Housing	
6				
7	14-0662-06	2	End Plate	
8	21-0016-01	1	CFCF 1000pf 500V	C3
9	21-0020-01	1	CFCF 120pF 500V	C4
10	21-0045-01	1	CFCM 100pF	C2
11				
12	22-0002-05	1	CFD 47pF	C1
13				
14	26-1519-01	3	RFC, 1k, 1/4W, 5%	R3,5,10
15	26-1553-01	1	" 2.2k, " "	R11
16	26-1559-01	1	" 180 " "	R7
17	26-1561-01	1	" 470 " "	R1
18	26-1556-01	1	" 51 " "	R2
19	26-4056-05	2	" 56 " "	R4,6
20				
21	32-0029-01	1	IF, 470µh	L1
22				
23	41-0015-01	1	DS IN82A	CR2
24	41-0015-04	1	DS 1S2198	CR1
25	44-0078-01	4	Connector	J1,2,3,4
26				
27	57-0321-01	1	PCB	
28				
29				
30				
31				
32				
33				
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60				

FIGURE 2-2B

	BY	NAME	DATE
APVD			
ENG			
CHK	D.STEADMAN	R.L. Kiner	11-6-72

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PARTS LIST

TITLE: ASSEMBLY, MONITOR MODULE (1200)

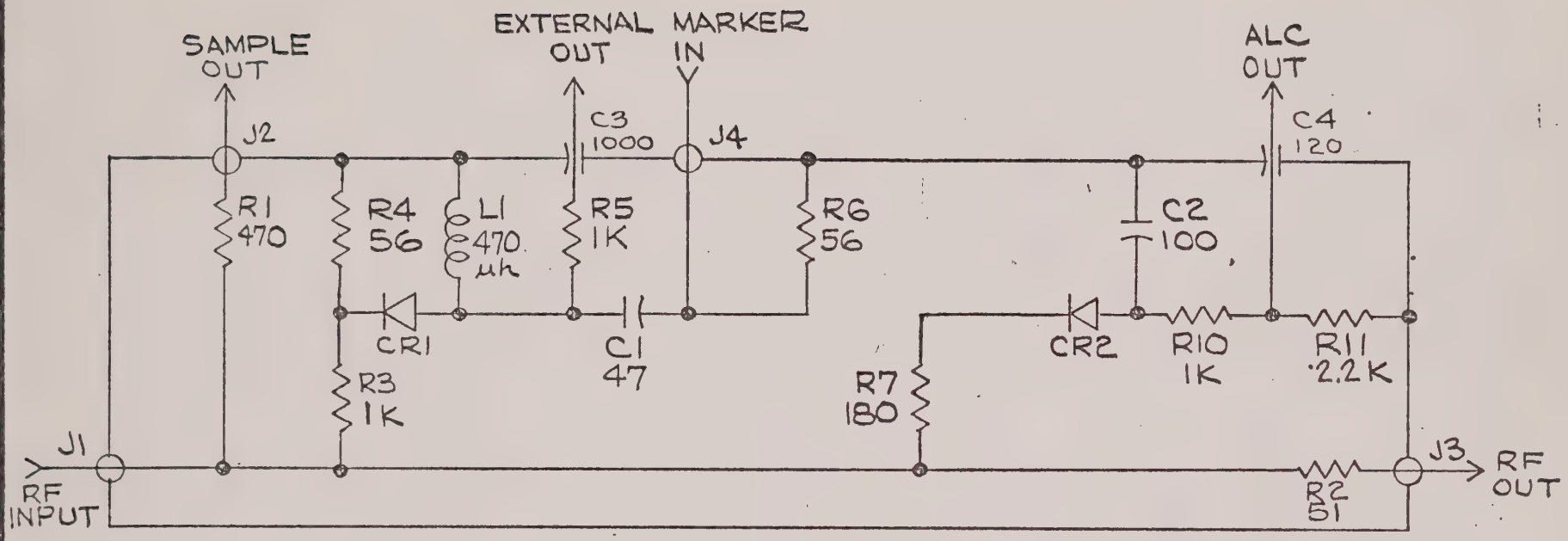
SIZE	DWG NO	REV
A	95-0321-01	

SH 2 OF 2

REL

95-0321-01

54-0321-01



NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTOR VALUES IN OHMS ±5%, ¼ WATT.
2. CAPACITOR VALUES IN PICOFARADS
3. DIODES TYPE IN82A (CR2)
   1S2198 (CR1)

FIGURE 2-3

LET	REVISION	DATE
A	R2 WAS 22Ω (7228)	2-5-73

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	[illegible]	10/5/72
.XX ± .01	CHK		
.XXX ± .005	ENGR	[illegible]	11-6-72
ANG. ± 1°	APVD		

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TITLE SCHEMATIC
MONITOR MODULE (1200)

SH 1 OF 1	SIZE	DWG NO	REV
REL	A	54-0321-01	A

MODEL 1205

TABLE OF CONTENTS

Paragraph	Description	Page
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2.0	OPERATING INSTRUCTIONS	2-1
3.0	THEORY OF OPERATION	3-1
4.0	TEST AND CALIBRATION INSTRUCTIONS	4-1
5.0	ASSEMBLY DRAWINGS, PARTS LISTS, AND SCHEMATIC DIAGRAMS	5-1
6.0	TROUBLE SHOOTING	6-1

1.0 INTRODUCTION

1.1 General Information

The Model 1205 is a sweep/signal generator covering the frequency range of 1 - 1500 MHz in three bands. The instrument features simplicity of operation and maintenance, high reliability, ruggedized construction, and the ability to fulfill a wide variety of functional applications.

The Model 1205 is capable of being equipped with Model 8020 (harmonic) markers or Model 8015 (single frequency) markers. The individual marker frequencies are determined by the individual application; a maximum of seven markers are available in a particular unit.

1.2 Detailed Specifications (Refer to Equipment Specification #51-0269)

1.0 DESCRIPTION

The Model 1205 is an all solid state 1-1500MHz frequency sweep generator. This instrument provides all necessary versatility for laboratory use while maintaining small size and rugged construction to withstand production environments.

2.0 ELECTRICAL SPECIFICATIONS

2.1 Frequency Range	Overall	1-1500MHz
	Band 1	1-500MHz
	Band 2	450-950MHz
	Band 3	900-1500MHz
2.2 Sweepwidth	Band 1	200KHz to 500MHz
	Band 2	200KHz to 500MHz
	Band 3	200KHz to 500MHz
2.3 RF Output (max.)	+7dBm (min.)	
2.4 Flatness	±.5dB	
2.5 Signal Purity		
2.5.1 Harmonic Content	-30dB	
2.5.2 Spurious Content	-30dB	
2.6 Stability		
2.6.1 5 min. drift	200KHz	
2.6.2 8 hour drift	2MHz	
2.6.3 Residual FM	20KHz	
2.7 Linearity	1%	
2.8 Output Impedance	50 ohm nominal	
2.9 RF Attenuator	102dB in 1dB steps, 3dB continuous variable	
2.10 Markers		
2.10.1 External input	.5V marker for -6dBm input	
2.10.2 Harmonic	Option 8020 (See 8020 specifications)	

APVD	EQUIPMENT SPECIFICATIONS FOR MODEL 1205 SWEEP GENERATOR	telonic™ TELONIC INDUSTRIES, INC. 21282 Laguna Canyon Road • Box 277 Laguna Beach, California 92652 Tel: 714 494-9401 • TWX: 910 596-1320	
CH. ENG.		DWG. NO. 51-0269	
		Page 1 of 2	

51-0269

2.10.3	Single Frequency	Option 8015 (See 8015 Specifications)

NOTE: A total of 7 markers can be installed in each unit. Any combination of 8015 and 8020 markers can be used.

2.11	Sweep Rate	
2.11.1	Line Lock	Line Frequency
2.11.2	Variable	.05-50Hz
2.11.3	External	1-20KHz
2.11.4	Continuous Wave	No horizontal sweep
2.12	Power	105/125V 210/250V 48/63Hz 30 watts max.

3.0 MECHANICAL SPECIFICATIONS

3.1	Dimensions	7" X 9" X 13" max.
3.2	Weight	20 lbs. max.

4.0 ENVIRONMENTAL SPECIFICATIONS

4.1	Ambient Temperature	0-50°C
4.2	Relative Humidity	0-80%

BY	APVD	EQUIPMENT SPECIFICATIONS FOR MODEL 1205 SWEEP GENERATOR	TELONIC INDUSTRIES, INC. 21282 Laguna Canyon Road • Box 277 Laguna Beach, California 92652 Tel: 714 494-9401 • TWX: 910 596-1320
ENG.	CH. ENG.		DWG. NO. 51-0269
CHK			Page 2 of 2

07-0003-01

2.0 OPERATING INSTRUCTIONS

2.1 General Description

The Model 1205 Sweep Generator is designed to permit the operator to use the instrument with a minimum of training and orientation. All controls and functional connectors are located on the front panel of the 1205 and are clearly labeled and located for ease of operation.

The rear panel contains only three items of interest to the operator - the 115/230V switch, the power cord, and the line fuse. The unit operates on 115/230V 50-60 Hz power lines; the fuse is a standard commercially available 1 A line fuse (Littlefuse type 3AG, or equivalent).

Adjustments internal to the unit are not normally needed for operational usage. The function of these internal controls will be discussed in Section 4.0 (Test and Calibration Instructions) of this manual; Section 2.2 outlines the operational control usage.

2.2 Front Panel Description (see Figure 2-1 for location of Front Panel Controls)

2.2.1 Controls

A.	POWER SWITCH	Provides ON/OFF control for AC power. The pilot light, located at A, is illuminated when the power switch is in the ON position. The pilot light is a light-emitting diode; consequently, replacement should never be required.
B.	BAND Switch	Provides output frequency band selection.
C.	FREQUENCY Control	Indicates the center frequency of the swept RF output. The triple dial calibration corresponds to the BAND switch ranges.
D.	SWEEP WIDTH Control	Provides continuous variation in sweep width from less than 200 kHz to 500 MHz.
E.	INT/EXT Switch	Provides for selection of sweep control by either the internal sawtooth generator or an external signal input.

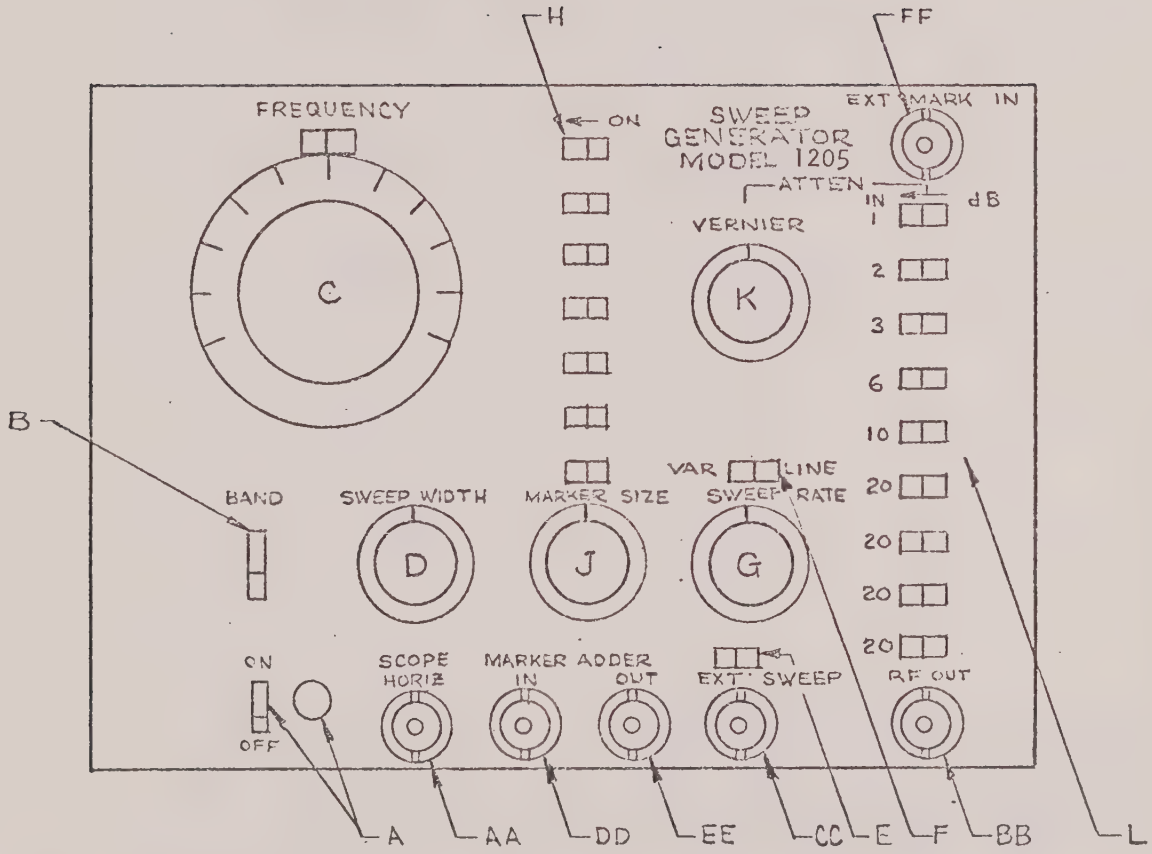


Figure 2-1

Front Panel Control Locations

F.	VAR/LINE Switch	Operative only during internal sweep, this switch enables the SWEEP RATE (G) control (VAR), or synchronizes the sweep to the frequency of the input power line (LINE).
G.	SWEEP RATE Control	Provides continuous control of the sweep rate from .05 Hz to 50 Hz when VAR/LINE switch is in VAR position.
H.	MARKER ON/OFF Switches	Provides ON/OFF control of the individual marker or marker group at the frequencies shown.
J.	MARKER SIZE Control	Provides control of the size of the birdy by-pass marker signals appearing at the MARKER ADDER OUT connector (EE).
K.	ATTENUATOR VERNIER Control	Provides nominally 3 dB of continuous adjustment of the RF output amplitude.
L.	ATTENUATOR IN/OUT Switches	This series of nine (9) slide switches attenuates the RF output by the amounts shown, up to 102 dB in 1 dB steps.

2.2.2 Connectors

AA.	SCOPE HORIZ	Type BNC connector - provides a nominal ±7V sawtooth at the sweep rate (internal sweep) at nominally 22kΩ. The output voltage during external sweep is a direct function of the external sweep input voltage.
BB.	RF OUT	Type BNC connector - provides swept RF output at an impedance of 50Ω.
CC.	EXT SWEEP	Type BNC connector - provides an input for externally sweeping the 1205. The input impedance is nominally 10kΩ.
DD.	MARKER ADDER IN	Type BNC connector - provides an input for adding the detected RF to the markers.

EE. MARKER ADDER OUT — Type BNC connector - provides a means of coupling the added marker and detected RF signals to the vertical input of an oscilloscope. Output impedance (DC) is 47kΩ min.

FF. EXT MARK IN — Type BNC connector - provides an input at 50Ω for an external RF source which is used to generate a mark at the source frequency. The mark is presented at the Marker Adder Output connector.

2.3 Typical Operation

The Model 1205 is designed utilizing the "birdy by-pass" marker technique which involves the addition of markers to the detected response of the device under test. This addition is performed in the marker adder circuitry of the Model 1205, a typical operational set-up is presented pictorially in Figure 2-2.

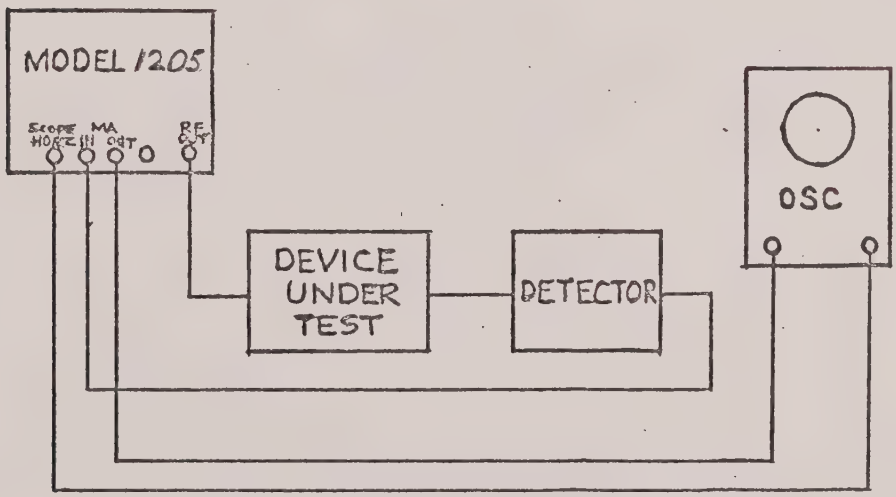


Figure 2-2

Typical Operational Configuration

3.0 THEORY OF OPERATION

3.1 General Description (refer to Figure 3-1)

The Model 1205 is basically a three-band sweep generator generating the outputs for the three bands from two voltage controlled oscillators. The high band output is coupled to the front panel through the Monitor/Attenuator assembly directly from the 900-1600 MHz VCO; the mid-band output is taken similarly from the 450-1000 MHz VCO. The low-band output is derived from the heterodyned combination of the high and mid-band oscillators, amplified in the 1-500 MHz amplifier and coupled through the monitor to the front panel.

Switching of the various oscillators is done through the RF Distribution/Mixer/Combiner (abbreviated R.D.M.C.), which is basically a solid-state component. No relays or other electromechanical devices are employed to accomplish the switching.

Drive for the oscillators is furnished through the linearity circuitry located on the Main P.C. Board Assembly. The linearity circuitry is driven directly from the INT/EXT switch, which enables either the internal rate generator or the external input signal.

The Monitor/Attenuator assembly serves a variety of functions, including providing of a detected signal to the leveling circuitry so that a "flat" output response can be obtained. Secondly, a sample of the sweep before attenuation is taken from the monitor and routed to the Marker assembly to permit generation of marker signals by the birdy by-pass technique.

The Marker assembly consists of marker "cards" which contain crystal oscillators and mixer through which the "birdy" is derived.

Additional functions are provided by all assemblies discussed in this section; these will be covered in greater detail in the following sections of this manual.

3.2 Detailed Description (refer to appropriate diagrams, located in Section 5.0 of this manual)

3.2.1 Power Supply (refer to Figure 5-6, Schematic No. 54-0274-01)

Basic power supply voltages for the Model 1205 are +24V and -24V. Unregulated DC is derived from rectifiers CR1 - CR4 and filtered by capacitors C1 and C2 (positive voltage) and C8 and C9 (negative voltage). Positive regulation is accomplished through the use of a standard regulator circuit - a 723 integrated regulator (E1) and pass transistor (Q2). Transistor Q1 and its associated circuitry are required only to insure that the maximum voltage rating of the 723 is not exceeded. Adjustment of the output voltage is achieved through R4 and its surrounding resistors.

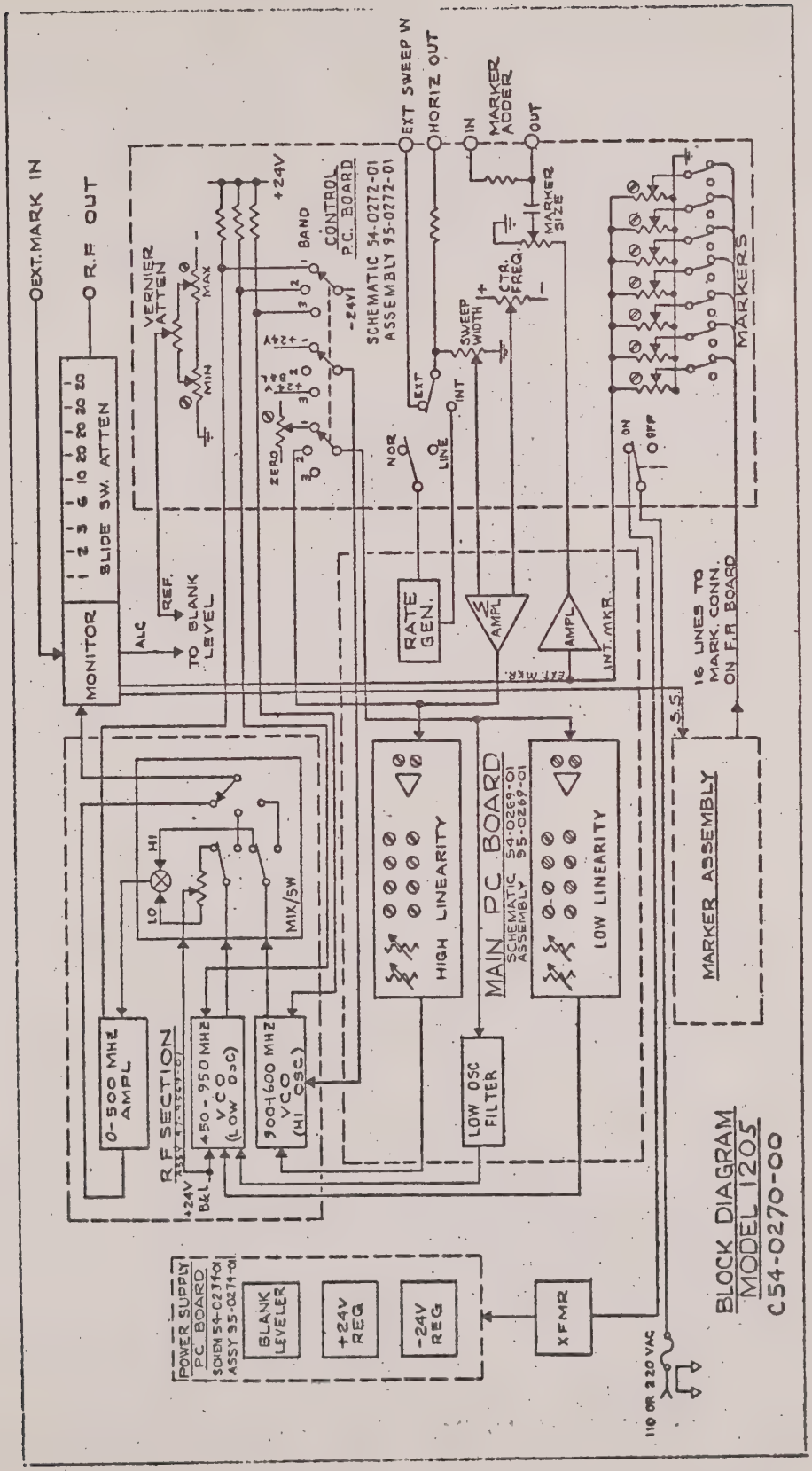

EXT. MARK IN
R.F. OUT
MONITOR
SLIDE SW. ATTEN
VERNIER ATTEN
MAX
MIN
ALC
REF.
TO BLANK LEVEL
+24V
BAND
CONTROL P.C. BOARD
-24V
ZERO
SCHEMATIC 54-0272-01
ASSEMBLY 95-0272-01
EXT SWEEP W
HORIZ OUT
MARKER ADDER
IN
OUT
MARKER SIZE
CTR. FREQ.
SWEEP WIDTH
EXT
INT
NOR
LINE
RATE GEN.
AMPL
INT. MKR.
EXT. MKR.
ON
OFF
MARKERS
16 LINES TO MARK. CONN. ON F.P. BOARD
MARKER ASSEMBLY
MAIN P.C. BOARD
SCHEMATIC 54-0269-01
ASSEMBLY 95-0269-01
HIGH LINEARITY
LOW LINEARITY
LOW OSC FILTER
RF SECTION
0-500 MHz AMPL
450-950 MHz VCO (Low Osc)
900-1600 MHz VCO (Hi Osc)
MIX/SW
LO
HI
+24V
B&L
POWER SUPPLY P.C. BOARD
SCHEM 54-0274-01
ASSY 95-0274-01
BLANK LEVELER
+24V REG
-24V REG
XFMR
110 OR 220 VAC
BLOCK DIAGRAM
MODEL 1205
C54-0270-00

Figure 3-1

Negative regulation is accomplished by means of operational amplifier (E2) and modified Darlington amplifier (Q7 and Q8). Transistor Q6 is required, as above, to prevent excessive voltage from appearing across E2. The reference for the -24V regulator is ground; the sense voltage is a combination of +24V and -24V taken through R19 and R20. In this manner, adjustment of BOTH supplies is achieved by a single control, R4.

Blanked voltages are achieved through a series of switching transistors deriving an input from the rate generation circuitry. Transistors Q3 and Q4 supply a positive 24V blanked signal to the Blanker/Level amplifier, E3. Transistors Q9 and Q10 supply the negative 24V blanked voltage to the oscillators and other circuitry.

The reference for the -24V leveler circuitry is taken from the reference ALC input, which is applied to pin 2 of E3. This is compared with the monitor input at pin 3 of E3 and results in the desired leveling voltage at the output. Transistor Q5 provides the necessary current handling capability required for this usage.

3.2.2 RF Assembly (refer to Interconnection Schematic #54-0270-01, Figure 5-2).

The RF assembly consists of four basic component assemblies. These assemblies include:

A. 450-1000 MHz Voltage Controlled Oscillator
B. 900-1600 MHz Voltage Controlled Oscillator
C. 1-500 MHz Amplifier
D. RF Distribution/Mixer/Combiner Module (R.D.M.C.)

The operation of these component assemblies on each band is discussed in the following paragraphs (refer to the Block Diagram, Figure 3-1):

A. Band 3 (900-1500 MHz)

When the band switch is in the Band 3 position, the RF from the 900-1600 MHz VCO is coupled directly to the Monitor/Attenuator assembly through the switching diodes in the R.D.M.C. Another section of the Band Switch connects the leveled +24V to the 900-1600 MHz oscillator.

B. Band 2 (450-950 MHz)

In the Band 2 position, the 450-1000 MHz VCO is coupled directly to the Monitor/Attenuator assembly through the

switching diodes of the R.D.M.C. The input to the Low Linearity circuitry is switched to the composite sweep width adder circuitry (see Section 3.2.4 and 3.2.5 for a discussion of the linearity circuitry); the leveling voltage is always applied directly to the 450-1000 MHz VCO module.

C. Band 1 (1-500 MHz)

When the Band Switch is in the Band 1 position, the output is accomplished by heterodyning the outputs of the two VCO modules. The 450-1000 MHz oscillator is connected to the low amplitude input of the mixer (part of the R.D.M.C.) and the 900-1600 MHz oscillator is switched to maximum output (no leveling) and coupled to the high amplitude input of the mixer. The 900-1600 MHz oscillator is swept by the High Linearity circuitry; the 450-1000 MHz oscillator is set to a CW frequency of 950 MHz by switching a DC voltage to the input of the Low Linearity circuitry.

The resultant output is coupled to the 1-500 MHz amplifier; the output of this module is routed back to the R.D.M.C. switching diodes for switching to the Monitor/ Attenuator circuitry. Leveling is accomplished by a combination of the leveling circuitry of the 450-1000 MHz VCO and an additional leveling diode in the R.D.M.C.

3.2.3 Rate Generator Circuitry (refer to Figures 5-4 and 5-8, Schematic Nos. 54-0269-01 & 54-0272-01)

The Rate Generator circuitry is designed to provide a variable frequency sawtooth for use in applications wherein variable sweep rates are desired, as well as to provide for a sweep synchronized with the line frequency. In addition, the cir-cuitry must be capable of being disabled and the sweep driven from an external source. Since the rate generator circuitry is comprised of components found on two assemblies, the cir-cuitry is presented in Figure 3-2 for ease of understanding.

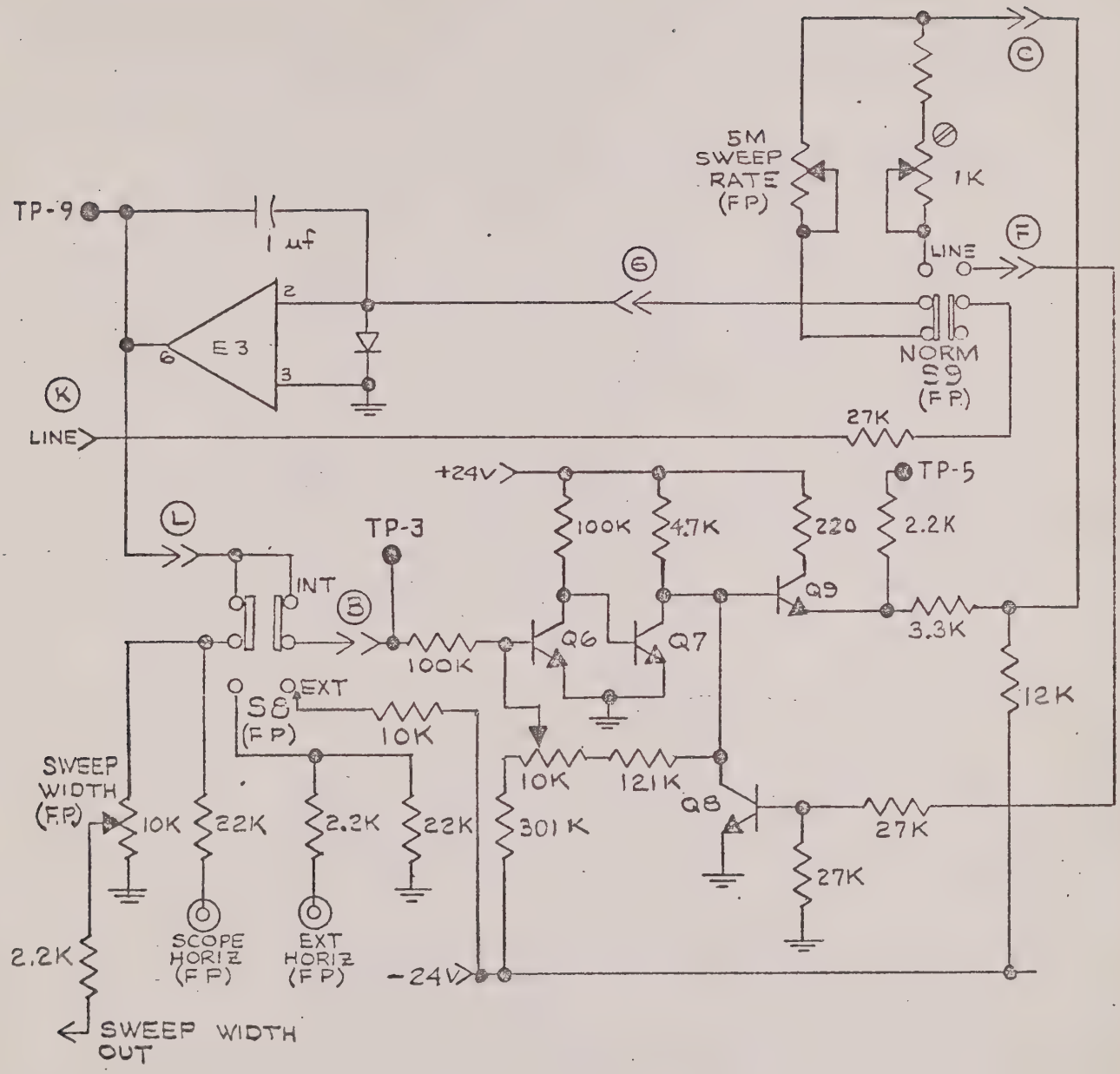
Consider first the internal variable mode (the mode in which the switches are shown). The rate generator operates as follows:

The output of Q9, a step function, creates either a positive or a negative step at point (C), depending on the state of Q9. Assuming that Q9 is in the HIGH state and the voltage at (C) positive, a negative going ramp is generated at the output of E3 by the integrating action of the SWEEP RATE control and the 1μF capacitor. When the negative ramp reaches a level determined by the input resistors of the limit

switch, Q6 turns OFF, Q7 ON, and Q9 switches to the LOW state. This forces the step function at (C) NEGATIVE, thus creating a positive going ramp at the output of E1. The ramp continues positive until a level is reached at which Q6 turns ON, and the entire process repeats. The rate of the integration (and hence the sweep rate) is governed by the 5M SWEEP RATE control and the 1μF capacitor.

In the LINE mode (wherein the output frequency is synchronized to the line frequency), the limit switch is controlled by Q8, which is gated by a line frequency input from the power supply. The amplitude of the sweep is governed in this mode by the size of the integrating resistor (1 kΩ, internally adjusted), rather than by the action of the limit switch.

In the EXTERNAL mode, the loop is broken by S8, and the output taken through a protective resistor directly from the external input signal.



NOTE: F.P. indicates Front Panel Control
S8 and S9 refer to schematic diagram #54-0272-01
TP-3, 5, 9; E3; Q6-Q9 refer to schematic diagram #54-0269-01

Figure 3-2

Rate Generator Schematic

3.2.4 High Linearity (refer to Figure 5-4, Schematic No.54-0269-01)

The high linearity circuitry is designed to develop a sweep voltage from the ramp generator for the high frequency voltage tuned oscillator (900-1600 MHz) such that the output frequency is a linear function of the input ramp.

The first step in this development is to sum the CENTER FREQUENCY and SWEEP WIDTH input signals from the front panel controls. This is accomplished by operational amplifier E4 and associated circuitry. The output of E4 is a composite of the two inputs and is used to drive the linearity circuitry for both the high and mid-range oscillators.

The composite sweep drive waveform is coupled directly to the linearity driver amplifier consisting of E2, Q5, and the associated bias circuitry. The output of this amplifier is used to drive the ten element resistor/diode network which forms a non-linear resistor. This resistor network is adjusted to the necessary degree of non-linearity by means of the adjustments shown on the schematic. The voltage developed across this non-linear resistor is coupled to the oscillator through isolation transistor Q4.

3.2.5 Low Linearity Circuitry (refer to Figure 5-4, Schematic No. 54-0269-01)

The low linearity circuitry operates in a manner similar to the high linearity circuitry, except for some switching differences and the addition of a filter drive circuit. The mid-range (450-1000 MHz) oscillator is actually swept ONLY in the Band Two position. In that case, the linearity driver amplifier, E1, and associated circuitry is driven directly from the composite sweep drive waveform; the amplifier in turn drives a non-linear resistor calibrated to offset the non-linearity of the 450-1000 MHz voltage controlled oscillator. Additionally, a filter drive circuit (Q14 and associated circuitry) is employed to control a varactor-tuned filter in the output of the mid-range VCO; this filter is used to reduce the harmonic content of the oscillator output waveform.

When the Model 1205 is operated in the Band 1 position, the low linearity circuitry is driven with a DC input such that the output of the 450-1000 MHz oscillator is a CW signal at 950 MHz. This output is used to heterodyne with the high frequency oscillator, thus producing the 1-500 MHz output. The input to the low linearity circuitry is taken through the BAND switch (S10, schematic #54-0272-01).

3.2.6 Monitor/Attenuator (refer to Figure 5-10)

The Monitor/Attenuator assembly is considered a non-repairable component item. The purpose of this assembly is fourfold:

A. Provide a DC output (negative-going) proportional in input RF amplitude for leveling purposes,
B. Provide attenuation capability of 102 dB in 1 dB steps,
C. Provide a leveled sweep sample output for the marker assembly, and
D. Provide a mixing capability such that an output "birdy" is obtained at the frequency of an external input RF marker signal.

3.2.7 Marker Assembly (refer to Figure 5-9)

The Marker assembly consists of a housing and the marker cards required for the particular units in question. The housing merely provides an RF enclosed distribution system for the power and sweep sample inputs to the cards. The cards are all basically similar in operation and contain one or more crystal oscillators, a mixer, and an output amplifier. The output of the cards consists of a "birdy" or "birdies" which are derived by the heterodyning of the crystal oscillator and the sweep sample. In the case of HARMONIC marker cards, the crystal oscillator output is amplified and differentiated before reaching the mixer diodes, in order to drive the mixer with a waveform that is rich in harmonics.

The output of EACH marker card is coupled to a variable resistor on the front panel printed circuit board in order to set the "birdy" amplitude to a desired value. Switches on the front panel provide power only to the cards desired by the operator.

The "birdy" output signals are added at the individual amplitude controls and coupled to an amplifier located on the Main Printed Circuit Board. The "birdy" signal from the monitor (for external RF markers) is added at this point. The output of this amplifier is coupled to the MARKER SIZE control, the output of which is connected to the MARKER ADDER Output connector. In this manner, the amplitude of the entire marker presentation is controllable from the front panel.

4.0 TEST AND CALIBRATION

4.1 General

This section details the procedures necessary to insure that the unit, as received, is properly functioning, as well as those procedures necessary to calibrate and test the unit from a routine maintenance viewpoint.

4.2 Inspection and Installation Instructions

Upon receipt, visually inspect the outside cabinet and front panel for any shipping damage or other defects. Verify that the line cord and manual are enclosed with the unit. Insert the line cord into any standard 115 or 230V outlet and insure the 115/230 switch is correctly set; the Model 1205 is now ready for operation.

4.3 Electrical Tests and Calibration Instructions

4.3.1 Test Equipment Required

A.	Oscilloscope	HP-130C, or equivalent
B.	Calibrated Detector	50Ω
C.	Marker Generator	Variable marker and harmonics as follows: 100 MHz, 50 MHz, 10 MHz, 1 MHz, .1 MHz
D.	Sweep Signal Generator, 1-1500 MHz	Telonic 2003 system 4
E.	Spectrum Analyzer	Systron Donner 751, or equivalent
F.	Frequency Counter	HP-5245L with 500 MHz plug-in levels, or equivalent
G.	Audio or Function Generator	HP-200CD, or equivalent
H.	Digital Voltmeter	
I.	DC Power Supply	0 to 15V

4.3.2 Power Supply (See Figure 5-5 for internal control locations)

A. Remove the top cover, turn the unit "ON", and observe that the pilot lamp is glowing.

B. Remove the rear panel cover plate and measure the output of the +24V supply (see Figure 4-1). This voltage should be ±0.2V of +24V. If not, adjust R4 on the Power Supply PC Board (95-0256-01) until the output voltage is within tolerance.

C. Measure the -24V supply (see Figure 4-1). This voltage should be ±0.4V of -24. Since the -24V reference is a function of +24V, an out-of-tolerance reading indicates a malfunction of the -24V supply.

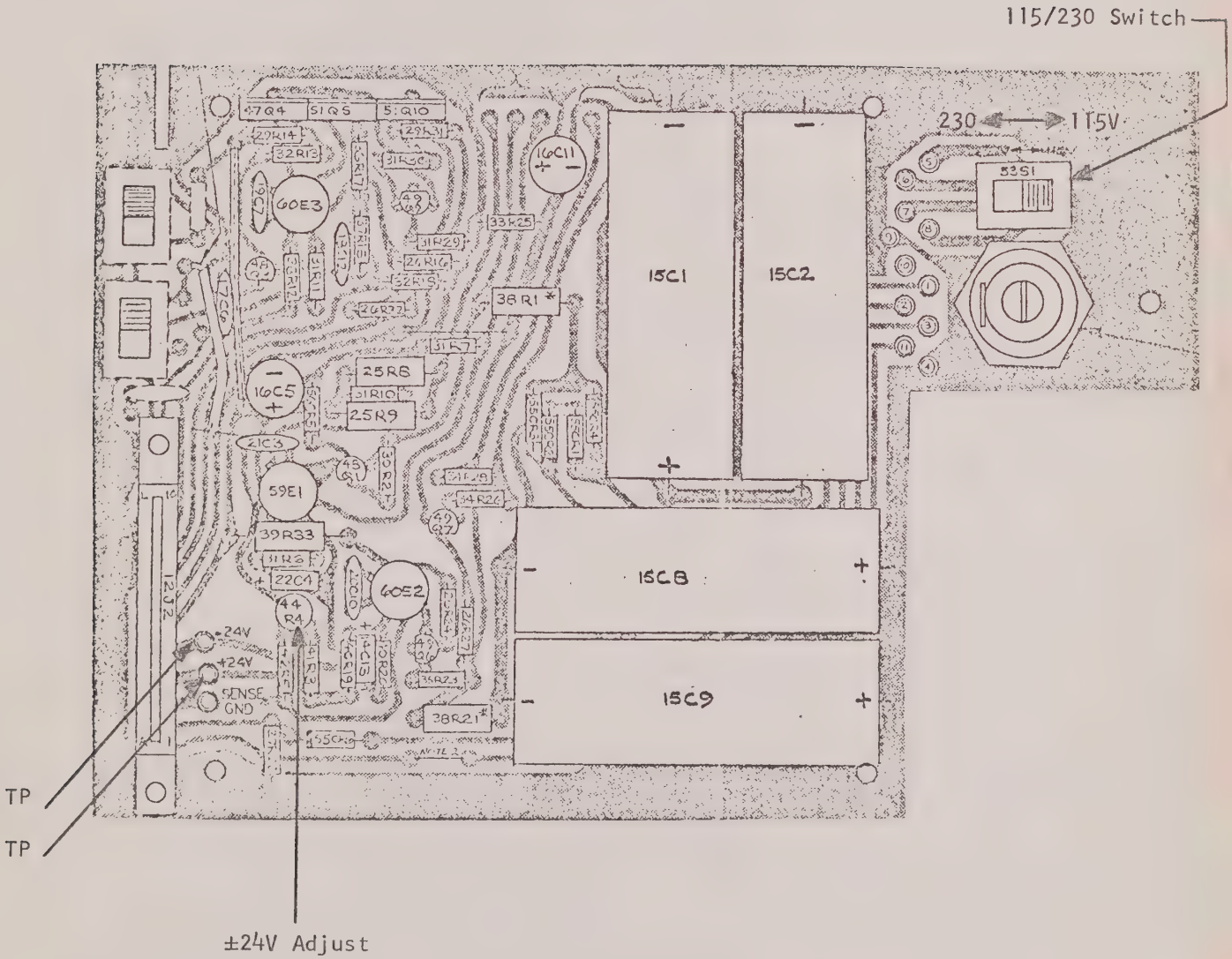


Figure 4-1

Test Point Location (Power Supply)

4.3.3 900-1500 MHz Output (Band 3)

A. Frequency Range and Linearity (see Figure 5-3 for internal control location)

1. Set the Front Panel controls as follows:

BAND SWITCH	Band 3 (900-1500)
FREQUENCY Control	1200 MHz
Markers	OFF
SWEEP WIDTH	Maximum (clockwise)
VAR/LINE Switch	VAR
INT/EXT	INT
SWEEP RATE Control	mid-range
Step Attenuator	0 dB
VERNIER Attenuator	Maximum (clockwise)

2. Connect the equipment as shown in Figure 4-2.

3. Observe the 50 MHz markers on the oscilloscope, and attenuate the Model 1205 output until clear marks are observed.

4. With the variable marker (of the marker system), ascertain that the Model 1205 is sweeping at least 900 to 1500 MHz. If not, adjust the Center Frequency and Sweep Width internal adjustments (R103 and R99 of the Main PCB Assembly, #95-0269-01) until the limits are achieved.

5. Observe that the linearity is within 1% (corresponding to a 1.1/1 variation in the spacing between 50 MHz markers). If not, adjust the linearity controls in the following order:

   R56, R58, R61, R63, R65, R67, R69, R71, R74, R76, R78, R80, R82, R84, R86, R88, R90, R91, R94, R95 of 95-0249-01.

   NOTE: R90, 91, 94 and 95 introduce reverse compensation; readjustment of some of the previously adjusted controls may be required.

   It may be necessary to readjust the Center Frequency and Sweep Width adjustments previously mentioned in order to keep the range intact.

6. Set the frequency dial to 900 MHz and reduce the sweep width gradually to nominally 10 MHz; keep the 900 MHz marker centered on the screen with the Center Frequency control, R103. Move the FREQUENCY Control (front panel) to 1200 MHz and adjust the Sweep Width control (R99) until the 1200 MHz marker is centered. Repeat this process until 900 MHz and 1200 MHz on the FREQUENCY dial correspond to the 900 and 1200 MHz birdies. The FREQUENCY dial should then be calibrated for all frequencies between 900 and 1500 MHz.

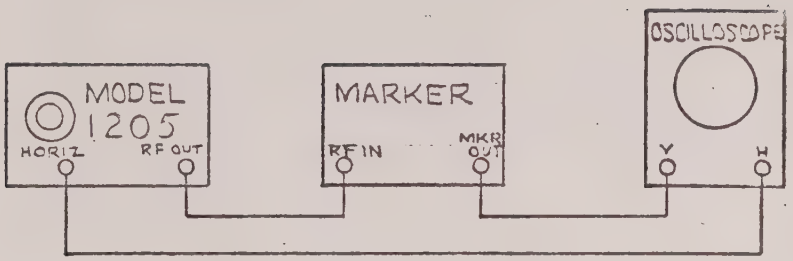


Figure 4-2

B. Sweep Width

1. With the front panel SWEEP WIDTH Control set to MAXIMUM, and the FREQUENCY dial set to approximately 1200 MHz (mid-range), ensure that the output is sweeping.

2. Set the SWEEP WIDTH Control to MINIMUM, and note that the sweep width does not exceed 200 kHz at any setting of the FREQUENCY Control. This is accomplished using 0.1 MHz markers or by noting the shape of the 1 MHz "birdies" at a width of 200 kHz.

C. Level (see Figure 5-7 for internal control location)

1. Connect the equipment as shown in Figure 4-3.

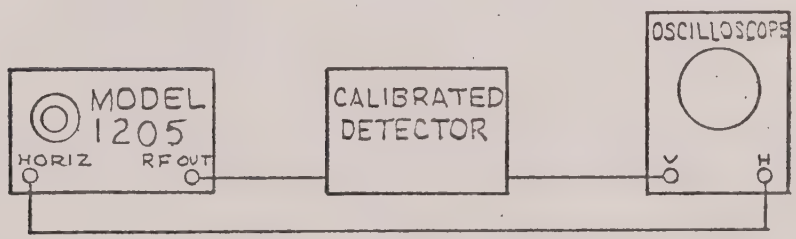


Figure 4-3

2. With the controls set as stated in paragraph 4.3.3.A.1, note that the output power exceeds +7 dBm at all frequencies. Using the step attenuator, note approximately 3.0 dB of attenuation. Rotate the Attenuation Vernier control fully CCW (maximum attenuation) and note that the level decreases nominally 3 dB. If not,

adjust the max and min level controls (R26 and R28 of the Control PC Board, #95-0272-01) until the maximum and minimum level conditions are met.

D. Flatness

With the controls set as stated in paragraph 4.3.3.A.1, and using the 1 dB step of the step attenuator, ascertain that the output level variation at full sweep does not exceed ±0.5 dB.

4.3.4 450-950 MHz Output (Band 2)

A. Frequency Range & Linearity (see Figure 5-3 for internal control location)

1. Set the Front Panel controls as follows:

BAND SWITCH	Band 2 (450-950 MHz)
FREQUENCY Control	700 MHz
Markers	Off
SWEEP WIDTH Control	Maximum (clockwise)
VAR/LINE Switch	VAR
INT/EXT Switch	INT
SWEEP RATE Control	mid-range
Step Attenuator	0 dB
VERNIER Attenuator	Maximum (clockwise)

2. Connect the equipment as shown in Figure 4-3.

3. Observe the 50 MHz markers on the oscilloscope and attenuate the 1205 output until clear marks are observed.

4. With the variable marker (of the marker system), ascertain that the 1205 is sweeping at least 450-950 MHz. If not, adjust the Center Frequency and Sweep Width controls (R52 and R48 respectively of the Main P.C. Board, 95-0269-01) until the limits are achieved.

5. Observe that the linearity is within 1% (corresponding to a 1.1/1 variation in the spacing between 50 MHz markers). If not, adjust the linearity controls in the following order:

R4,R6,R9,R11,R14,R16,R19,R21,R23,R25,R27,R29,R31,R33,R36, R37,R39,R40,R43 and R44 of 95-0249-01.

NOTE: R39,R40,R43 and R44 introduce reverse compensation; a readjustment of some of the previously adjusted controls may be required.

It may be necessary to readjust the Center Frequency and Sweep Width adjustments previously mentioned in order to keep the range intact.

6. Set the FREQUENCY dial to 450 MHz and reduce the sweep width gradually to nominally 10 MHz; keep the 450 MHz marker centered on the screen with the Center Frequency control, R52. Move the front panel FREQUENCY Control to 600 MHz and adjust the Sweep Width Control (R48) until the 600 MHz marker is centered. Repeat this process until 450 and 600 MHz on the FREQUENCY dial correspond to the 450 and 600 MHz birdies. The frequency dial should then be calibrated for all frequencies between 450 and 950 MHz.

B. Sweep Width

1. With the front panel SWEEP WIDTH Control set to maximum and the FREQUENCY dial set to 700 MHz (mid-range), ensure that the output is sweeping from less than 450 MHz to greater than 950 MHz.

2. Set the SWEEP WIDTH Control to minimum, and note that the sweep width does not exceed 200 kHz at any setting of the FREQUENCY Control. This is accomplished by extrapolating birdy width on the 1 MHz or the 0.1 MHz markers.

C. Level

1. Connect the equipment as shown in Figure 4-3.

2. With the controls set as stated in Paragraph 4.3.4.A.1, note that the output power exceeds +7 dBm at all frequencies.

D. Flatness

With the controls set as stated in paragraph 4.3.4.A.1, and using the 1 dB step of the step attenuator, ascertain that the output level variation at full sweep does not exceed ±0.5 dB.

4.3.5 1-500 MHz RF Output (Band 1)

A. Frequency Range (see Figure 5-7 for internal control location)

1. Set the Front Panel controls as follows:

BAND SWITCH	Band 1 (1-500 MHz)
FREQUENCY Control	250 MHz
Markers	Off
SWEEP WIDTH Control	Maximum (clockwise)

VAR/LINE Switch	VAR
INT/EXT Switch	INT
SWEEP RATE Control	mid-range
Step Attenuator	0 dB
VERNIER Attenuator	Maximum (clockwise)

2. Connect the equipment as shown in Figure 4-3.

3. Observe the 50 MHz markers on the oscilloscope and attenuate the 1205 output until clear marks are observed. Ascertain that the 1205 is sweeping from at least 0 to more than 500 MHz.

4. Set the FREQUENCY Control to 250 MHz, and reduce the sweep width gradually to nominally 1 MHz. Adjust the ZERO control (R31 of the Control P.C. Board, 95-0252-01) until the 250 MHz marker is centered on the screen. The frequency dial should be calibrated at this point.

5. Check the linearity and note that it is within 1.1/1.

B. Sweep Width

1. With the front panel SWEEP WIDTH Control set to MAXIMUM, and the FREQUENCY dial set to 250 MHz (mid-range), ensure that the output is sweeping from less than 0 to more than 500 MHz.

2. Set the sweep width to MINIMUM, and note that the sweep width does not exceed 200 kHz at any setting of the FREQUENCY control. This is accomplished by extrapolating birdy width on the 1 MHz or the 0.1 MHz markers.

C. Level

1. Connect the equipment as shown in Figure 4-3.

2. With the controls set as stated in paragraph 4.3.5.A.1, note that the output power exceeds 7 dBm at all frequencies between 1 and 500 MHz.

D. Flatness

With the controls set as stated in paragraph 4.3.5.A.1, and using the 1 dB step of the step attenuator, ascertain that the output level variation at full sweep does not exceed ±0.5 dB between 1 and 450 MHz.

4.3.6 Spectral Purity

A. Connect the equipment as shown in Figure 4-4.

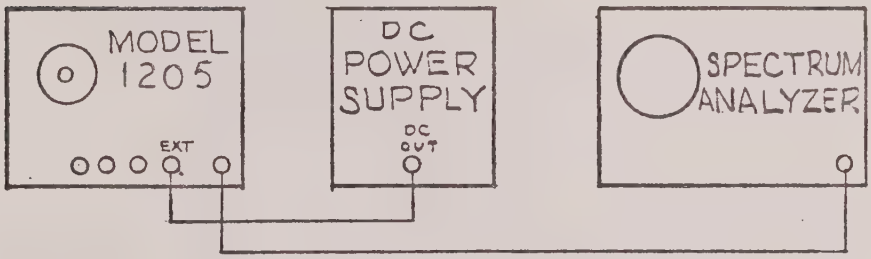


Figure 4-4

B. Set the front panel controls as follows:

Attenuator	0 dB
VERNIER Attenuator	Minimum (clockwise)
INT/EXT Switch	EXT
Markers	Off

C. 1-500 MHz Output

1. Set the BAND SWITCH to Band 1 (1-500 MHz). Vary the DC from the power supply from - 12 VDC to +12 VDC and verify that the RF output covers the entire range of 1-500 MHz.

2. Observe the spurious and harmonic content in the band (20-500 MHz). Verify that all spurious and harmonic outputs are at least 30 dB below the desired output.

D. 450-950 MHz Output

1. Set the BAND SWITCH to Band 2 (450-950 MHz). Vary the DC from the power supply from -12 to +12 VDC and verify that the RF output covers the entire range of 450 to 950 MHz.

2. Observe the spurious and harmonic content within the band (450-950 MHz). Verify that all spurious and harmonic signals are at least 30 dB below the desired output. Excessive harmonic content when the desired output is near the low frequency portion of the band may indicate an improperly adjusted varactor

tuned filter in the 450-1000 MHz oscillator. Should this occur, adjust R138 of the Main P.C. Board (95-0269-01) for minimum harmonic output. (See Figure 5-3)

E. 900-1500 MHz Output

1. Set the BAND SWITCH to Band 3 (900-1500 MHz). Vary the DC from the power supply from -12 VDC to +12 VDC and verify that the RF output covers the entire range from 900 to 1500 MHz.

2. Observe the spurious and harmonic content in the band (900-1500 MHz). Verify that all spurious and harmonic outputs are at least 30 dB below the desired output.

4.3.7 Sweep Control

A. Internal

1. Connect the equipment as shown in Figure 4-5. Adjust the oscilloscope internal time base to display at least one full cycle of the sawtooth for each of the following tests.

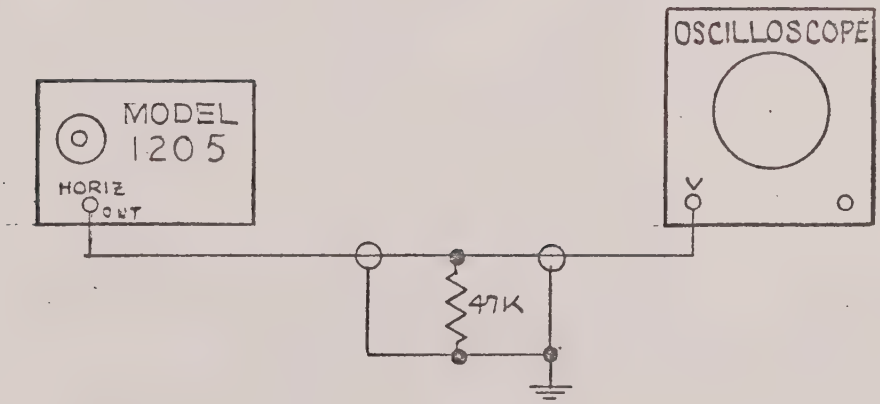


Figure 4-5

2. Set the VAR/LINE Switch to VAR, the INT/EXT Switch INT, and the SWEEP RATE Control to maximum (full clockwise). Verify that the sweep rate is greater than 500 Hz (less than 20 msec per cycle) and that the sweep amplitude is greater than 7 V P-P.

3. With the SWEEP RATE Control fully counterclockwise (minimum sweep rate), verify that the minimum sweep rate is less than 0.5 Hz (greater than 2000 msec) and that the amplitude variation with respect to the amplitude at the maximum sweep rate is less than 2%.

4. Set the VAR/LINE Switch to LINE, and verify that the sweep rate is synchronized with the line frequency and that the amplitude variation is less than 10% with respect to that in paragraph 4.3.7.A.2. The amplitude of the waveform is adjustable by means of R21 of the Control PC Board, 95-0272-01 (See Figure 5-7).

B. External

1. Connect the equipment as shown in Figure 4-6.

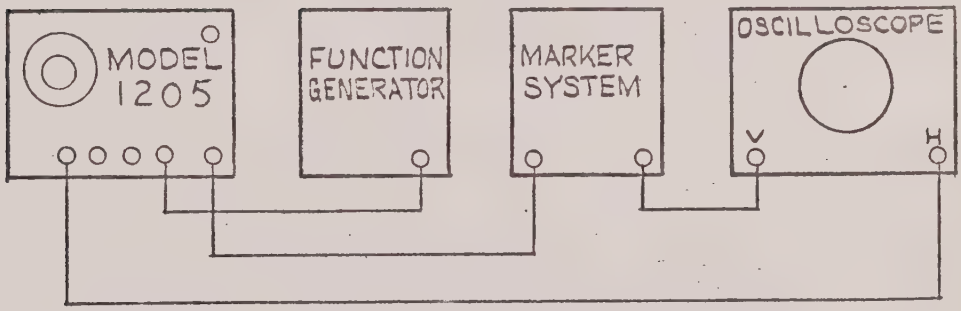


Figure 4-6

2. Set the INT/EXT Switch to EXT, and adjust the function generator to provide a 100 ±5 Hz sine wave output at an amplitude of 24.5 ±0.5V P-P.

3. Using the 50 MHz markers, verify that the sweep width is at least 400 MHz on each of the three bands.

4. Vary the function generator frequency downward slowly to 1 Hz. Verify that the sweep width at all frequencies of the external generator is greater than 400 MHz. Perform this test on all bands.

5. Increase the external sweep rate to 20 kHz. Verify that the sweep width is at least 1 MHz at 300 MHz. This is achieved by using a known badwidth filter with high speed detector or by driving a high quality FM receiver with the 1205 and observing the discriminator output. (See Figure 4-7)

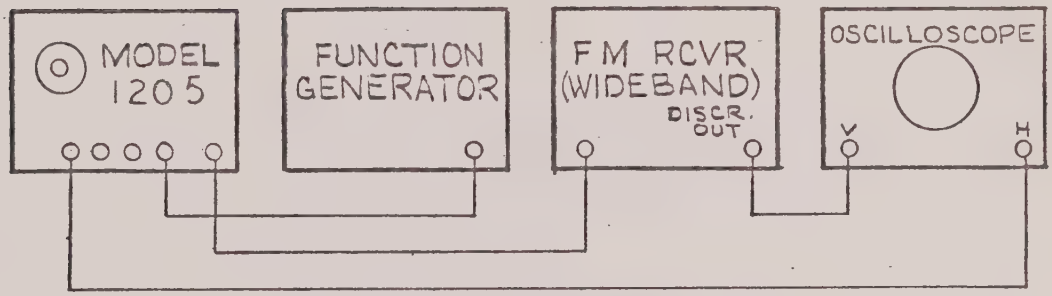


Figure 4-7

4.3.8 Marker Tests

Markers for the 1205 fall into two basic catagories - single frequency and harmonic. All markers are crystal controlled; consequently, frequency verification will normally not be required. In the event of a failure or of a replacement of any component on any marker card, refer to the schematic of the individual cards for the location and function of the various adjustments.

A. Single Frequency Markers (Model 8015)

1. Connect the equipment as shown in Figure 4-8.

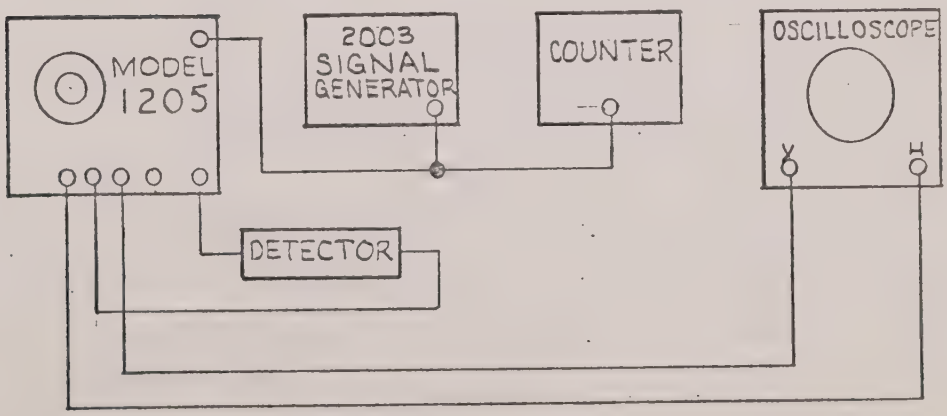


Figure 4-8

2. Set the front panel controls as follows:

BAND SWITCH	)As required to cover
FREQUENCY Control	)the marker
SWEEP WIDTH Control	)frequency
SWEEP RATE Control	mid-range
VAR/LINE Switch	VAR
INT/EXT Switch	INT
Attenuator	0 dB

3. Turn each single frequency marker ON individually, and note that each marker output size is adjustable with the MARKER SIZE Control. Individual marker sizes may be balanced against each other with the individual size control adjustments, R1 through R7 of the Control Board 95-0272-01 (See Figure 5-7).

4. The frequency of each marker may be verified by adjusting the 2003 (in the CW mode) until the external marker overlaps the internal marker. The frequency counter will then indicate the marker frequency.

   NOTE: Harmonics of the 2003 signal may be used to verify the marker frequency in areas above the counter range. For example, with a 500 MHz counter, a frequency of 300 MHz may be used to verify the frequency of the 900 MHz marker by overlapping the third harmonic of the CW generator with the internally generated mark.

B. Harmonic Markers

1. Connect the equipment as shown in Figure 4-8 and set the front panel controls as indicated in paragraph 4.3.8.A.2.

2. Turn each of the harmonic markers on individually and note that each harmonic marker amplitude is adjustable with the MARKER SIZE Control. The individual amplitudes of the markers are adjustable by resistors R1 through R7 of the Control P.C. Board, 95-0272-01 (See Figure 5-7).

3. The frequency of each harmonic marker may be verified with the CW generator by overlapping ANY convenient harmonic of the internal markers.

5.0 ASSEMBLY DRAWINGS, PARTS LISTS, AND SCHEMATIC DIAGRAMS

5.1 General

Assembly drawings, parts lists, and schematic diagrams are contained in this section for repairable subassemblies of the Model 1205.

Figure 5-1 is the assembly "tree" for the 1205 and indicates the interrelationship for the various assemblies.

5.2 Index of Assemblies

The parts lists, assembly drawings, and schematic diagrams for the 1205 are included in the following order in this section:

	Drawing No.	Figure No.
Interconnection Schematic	54-0270-01	5-2
Side P.C. Board Assembly		
Assembly Drawing & P/L	95-0269-01	5-3A,B
Schematic Diagram	54-0269-01	5-4A,B
Power Supply Assembly		
P.C.B. Assembly & P/L	95-0274-01	5-5A,B
Schematic Diagram	54-0273-( )	5-6
Front Panel Control Assembly		
P.C.B. Assembly & P/L	95-0272-01	5-7A,B
Schematic Diagram	54-0272-01	5-8
Marker Assembly		
Parts List	97-1082-( )	5-9
Schematic Diagram	55-8573-01	5-10
Attenuator/Monitor		
Module Assembly & P/L	95-0253-01	5-11A,B
P.C.B. Assembly & P/L	95-0257-01	5-12A,B
Schematic Diagram	54-0253-01	5-13
R.F. Distribution Mixer/Combiner		
RDMC Module Assembly & P/L	95-0259-01	5-14A,B
P.C.B. Assembly & P/L	95-0260-01	5-15A,B
Schematic Diagram	54-0259-01	5-16
450-1000 MHz Oscillator		
Module Assembly & P/L	95-0279-01	5-17A,B
P.C.B. Assembly & P/L	95-0280-01	5-18A,B
Schematic Diagram	54-0279-01	5-19

900-1600 MHz Oscillator		
Module Assembly & P/L	95-0281-01	5-20A,B
P.C.B. Assembly & P/L	95-0282-01	5-21A,B
Schematic Diagram	54-0281-01	5-22
1-500 MHz Amplifier		
Module Assembly & P/L	95-0305-01	5-23A,B
P.C.B. Assembly & P/L	95-0304-01	5-24A,B
Schematic Diagram	54-0305-01	5-25

5.3 Drawing Practice

5.3.1 All components in each assembly are numbered in sequence from "1".

5.3.2 All resistors are shown in ohms unless otherwise specified.

5.3.3 All capacitor values are shown in picofarads (pF) unless otherwise specified.

5.3.4 All inductor values are shown in microhenries (μH) unless otherwise specified.

5.3.5 Table 5-1 specifies the abbreviations used for components in the Model 1205 parts lists.

	TELONIC INDUSTRIES, INC.	Title: USE OF ABBREVIATIONS	No. 619	Rev. B
	STANDARD PROCEDURE	TABLE 5-1	Page 1 of 1	

	Signature	Date	Dist: ENGINEERING DEPARTMENT
g	KERANEN	10-26-70	
pl	RMcCormick	10.26.70	
	[illegible]	1/28/71	
	KERANEN	10-1-71	

1.0 SCOPE.

This document describes and defines standard abbreviations to be used in all Telonic Industries drawings and communications.

2.0 PURPOSE.

To establish a uniform list of standard abbreviations.

3.0 LIST OF ABBREVIATIONS.

3.1 Prefixes.

3.1.1 Multiple

Number	Prefix	Abbrev.
10^9	GIGA	G
10^6	MEGA	M
10^3	KILO	k

3.1.2 Submultiple

Number	Prefix	Abbrev.
10^{-3}	MILLI	m
10^{-6}	MICRO	μ
10^{-9}	NANO	n
10^{-12}	PICO	p

3.2 Units.

Unit	Abbrev.
HERTZ	Hz
AMPERE	A
WATT	W
VOLT	V
FARAD	F
HENRY	H
OHM	Ω

3.3 Unless Specified.
Resistors are 1/4 watt in ohms.
Capacitors are in pF.

3.4 Colors.

Color	Abbrev.
BLACK	BLK.
RED	RED
BLUE	BLU.
WHITE	WHT.
GREEN	GRN.
ORANGE	ORN.
VIOLET	VIO.
BROWN	BRN.
YELLOW	YEL.
GRAY	GRA.

3.5 Miscellaneous

DECIBEL	dB
FREQUENCY CONTROLLED VOLTAGE	FCV
FACTORY SELECTED VALUES	FSV
GROUND	GRD.
NOT ASSIGNED	NA
PART OF	PO
PEAK-TO-PEAK	P-P
SAME AS	SA
SUBJECT TO CHANGE	SC

3.6 Component Designations

Component	Part Description	Circuit Reference
Capacitors:		
Fixed Ceramic	CFC	C
Fixed Ceramic Feed-Thru	CFCF	C
Fixed Discap	CFD	C
Fixed Electrolytic	CFE	C
Fixed Metal Film	CFF	C
Fixed Mica	CFM	C
Fixed Mylar	CFMY	C
Fixed Composition	CFN	C
Fixed Oil	CFO	C
Fixed Paper	CFP	C
Fixed Polyester	CFPE	C
Fixed Teflon	CFT	C
Fixed Tantalum	CFTA	C
Trimmer, Ceramic, Disc	CTCD	C
Trimmer, Ceramic, Tubular	CTCT	C
Variable, Air	CVA	C
Variable, Glass-dielectric	CVG	C
Printed		CP
Circuit Breakers	CKT BKR	S
Crystals	XTAL	Y
Diodes:		
Semiconductor	DS	CR
Semiconductor, Tunnel	DST	CR
Semiconductor, Varactor	DSV	CR
Semiconductor, Zener	DSZ	CR
Fuses	--	F
Inductors:		
Fixed	IF	L
Variable	IV	L
Printed		LP
Integrated Circuits:		
Digital	ICD	E
Linear	ICL	E
Lamps, Indicator	LI	DS
Meters	--	M
Plugs, Cable	PC	P
Power Supplies	PWR SUP	PS
Printed Circuit Boards	PCB	PCB
Receptacles, Jack	RJ	J
Resistors:		
Fixed Composition	RFC	R
Fixed Carbon Film	RFCF	R
Fixed Metal Film	RFMF	R
Fixed Wirewound	RFWW	R
Variable, Composition	RVC	R
Variable, Dual Composition	RVDC	R
Variable, Dual, Wire-wound/Composition	RVDWW	R
Voltage Variable (Varistor)	RVV	R
Variable, Wirewound	RVWW	R
Switches:		
Rotary	SWR	S
Slide	SWS	S
Toggle	SWT	S
Terminator Cables	TC	--
Test Points	TP	TP
Time Delay	TD	--
Transformers, Power	XFMR	T
Transistors	TR	Q
Field Effect	TRFE	Q
Tubes, Electron	TE	V
Wires	--	W

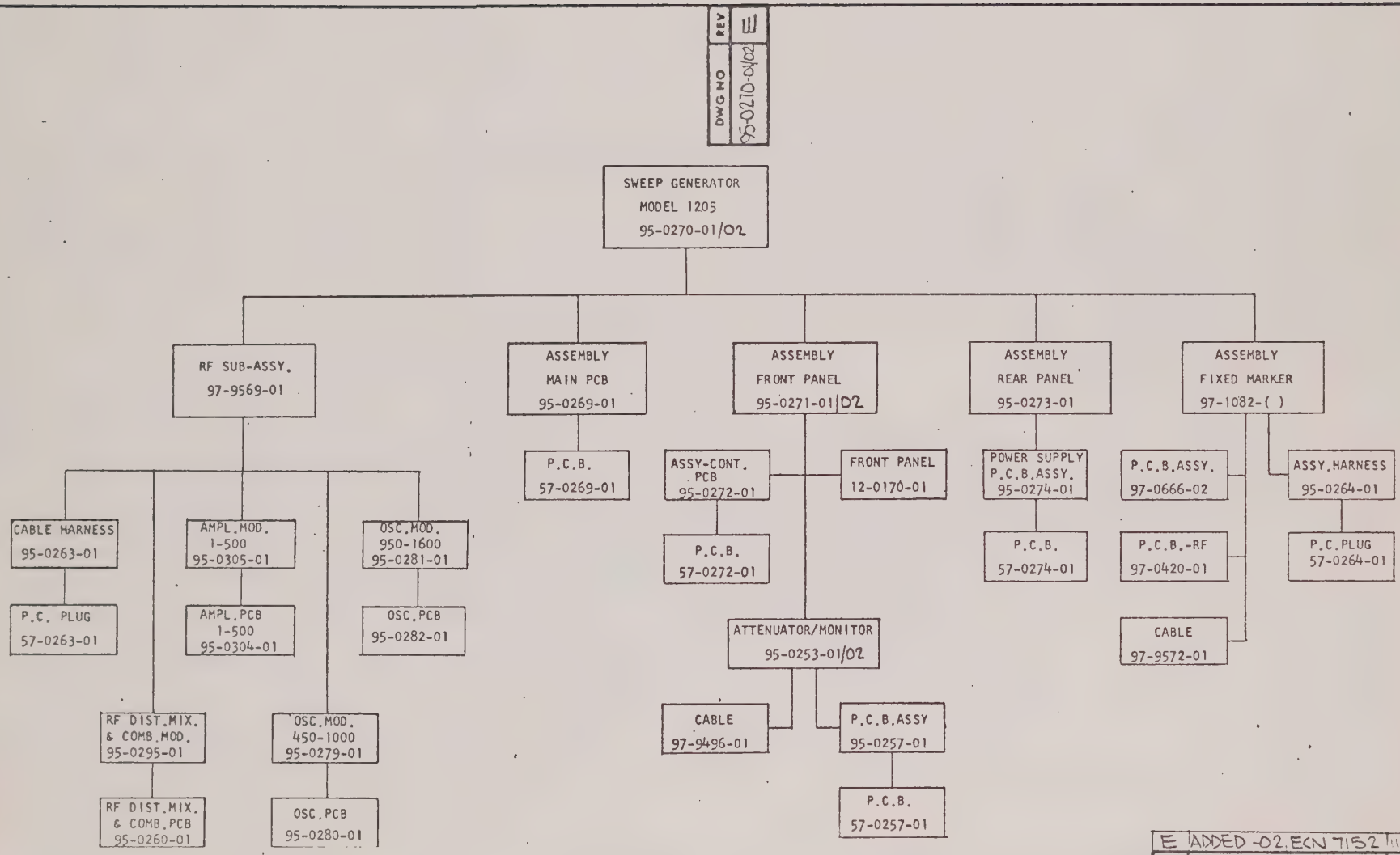


Figure 5-1

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	B.R	5-3-72
.XX ±.01	CHK		
.XXX ±.005	ENGR		
ANG. ±1°	APVD		

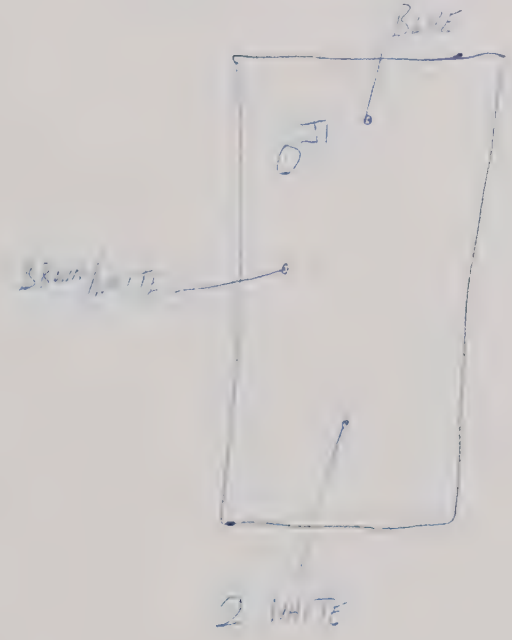
TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel 714 494-9401 • TWX 910 596-1320

LET	REVISION	DATE
E	ADDED -02. ECN 7152	11-20-72

TITLE: ASSEMBLY SWEEP GENERATOR MODEL 1205

SH 2 OF 3	SIZE	DWG NO	REV
REL	B	95-0270-01/02	E

807-6037-01


BLUE
SKIN
2 WHITE

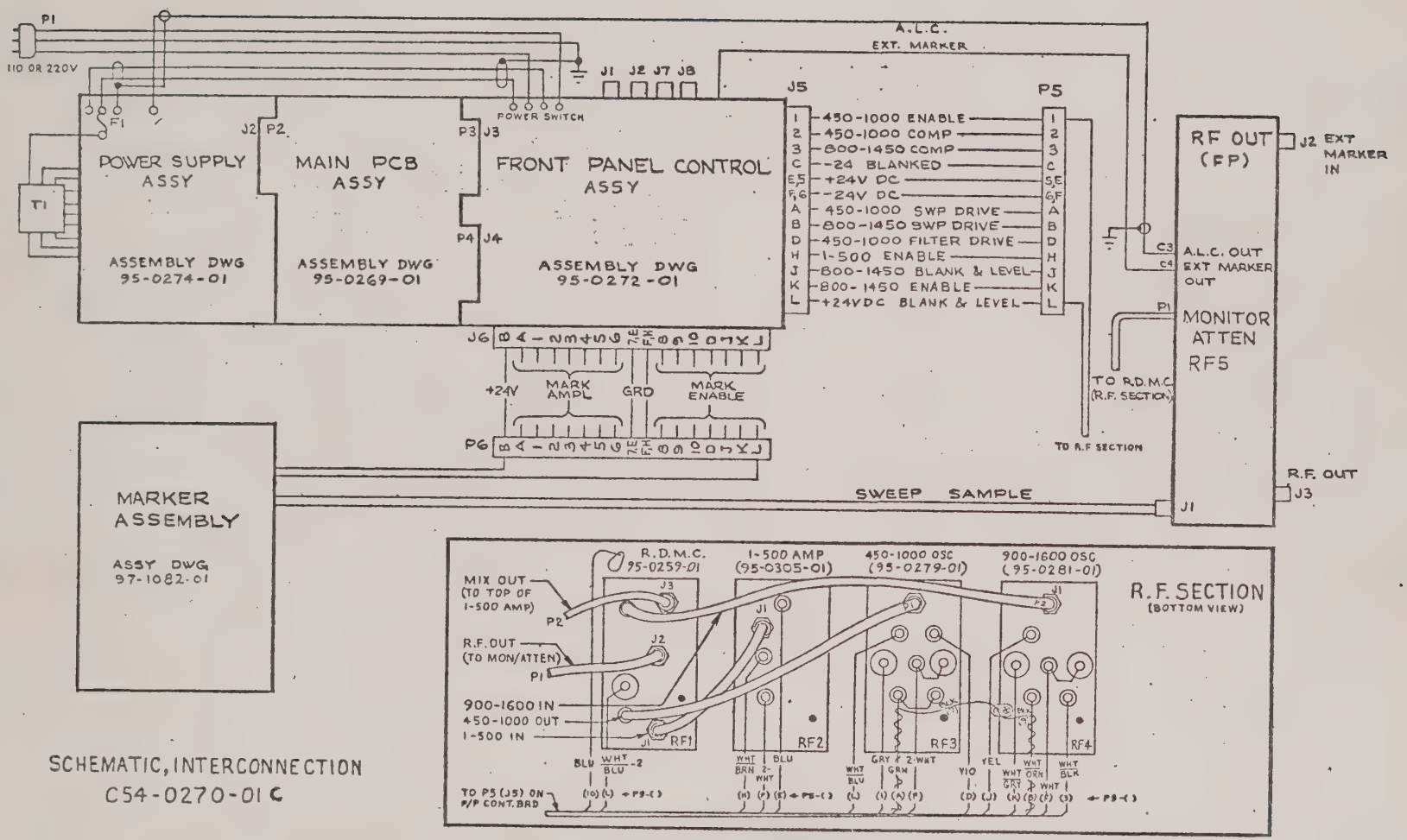


Figure 5-2

SCHEMATIC, INTERCONNECTION
C54-0270-01 C

TELONIC SYSTEMS	SCHEMATIC INTERCONNECTION MODEL 1205		
TOLERANCES	AOL	RELEASED	SIZE C
SCALE —		SHEET 1 OF 1	DRAWING NUMBER 54-0270-01 C

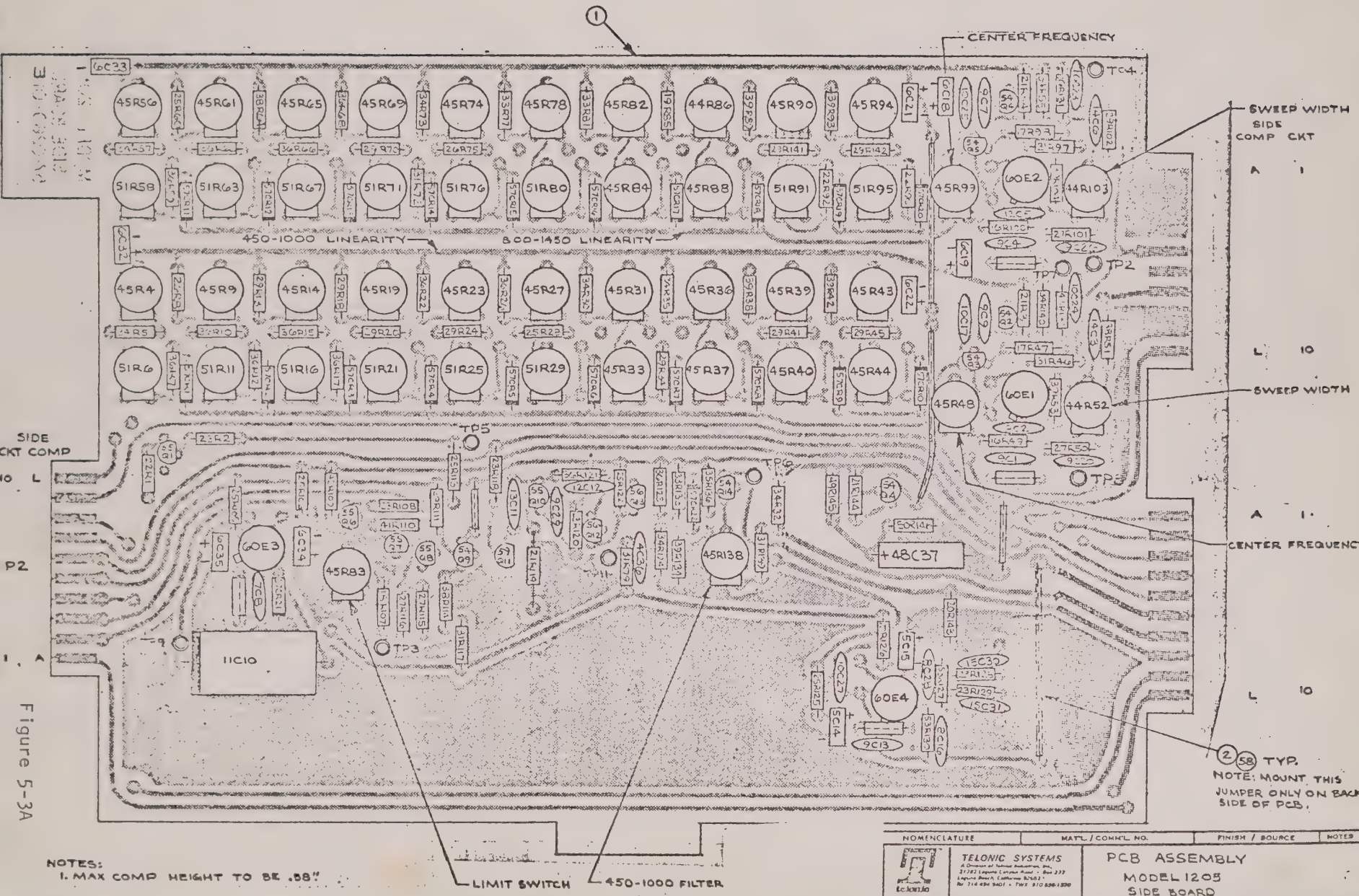

CENTER FREQUENCY
SWEEP WIDTH SIDE COMP CKT
SWEEP WIDTH
CENTER FREQUENCY
450-1000 LINEARITY
800-1450 LINEARITY
TP1
TP2
TP3
TP5
+48C37
11C10
LIMIT SWITCH
450-1000 FILTER
2 58 TYP.
NOTE: MOUNT THIS JUMPER ONLY ON BACK SIDE OF PCB.
NOTES:
1. MAX COMP HEIGHT TO BE .58".
NOMENCLATURE
MATL / COMM'L NO.
FINISH / SOURCE
NOTES
TELONIC SYSTEMS
PCB ASSEMBLY
MODEL 1205
SIDE BOARD
TOLERANCES
RELEASED
SHEET 1 OF 2
SIZE C
DRAWING NUMBER 95-0269-01
REV R

Figure 5-3A

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	57-0269-01	1	P.C.Board	
2	00-1070-01	A/R	Sleeving	
3	09-1504-01	9	Terminal, Test Point	
4	22-0170-01	1	CFD,1μF	C36
5	20-0030-01	2	CFTA,10μF/25V	C14,15
6	20-0064-06	8	CFTA,2,7μF/35V	C18,19,21,22,32,33,34,35
7	22-0001-06	1	CFD,10pF	C8
8	22-0004-01	3	CFD,470pF	C2,16,28
9	22-0038-01	8	CFD,100pF	C1,4,7,9,13,20,26,29
10	22-0055-01	5	CFD,.01μF	C17,23,24,25,27
11	22-0203-01	1	CFMY,1μF	C10
12	22-0123-01	2	CFD,220pF	C5,12
13	22-0171-01	1	CFD,1μF/3V	C11
14	22-0002-01	2	CFD,33pF	C3,6
15	22-0005-01	2	CFD,.001μF	C30,31
16	26-0160-01	2	RFC,8.2kΩ,±10%,1/4W	R49,100
17	26-0161-01	2	RFC,2.7kΩ	R47,98,
18	26-4382-06	1	RFC,82kΩ	R107
19	26-1518-01	1	RFC,22kΩ	R85
20	26-1541-01	1	RFC,470k Ω	R143
21	26-1522-01	4	RFC,100Ω	R3,54,119,144
22	26-1524-01	3	RFC,47kΩ	R1,92,96
23	26-1525-01	6	RFC,100kΩ	R2,108,118,120,128
24				129
25	26-1527-01	7	RFC,2.2kΩ	R12528,60,105,106,113,122
26	26-1528-01	2	RFC,1kΩ	R8,75
27	26-1529-01	4	RFC,27kΩ	R50,101,115,116
28	26-1563-01	1	RFC, 1.8K	R126
29	26-1531-01	12	RFC,4,7kΩ	R13,18,20,24,34,41,45,70,102,
30				111,141,142
31	26-1532-01	6	RFC,12kΩ	R46,72,79,97,117,139
32				
33	26-1533-01	3	RFC,18kΩ	R77,81,133
34	26-1535-01	9	RFC,15kΩ	R5,30,32,55,57,73,124,140,35
35	26-1536-01	1	RFC,220kΩ	R136
36	26-1594-01	14	RFC,10kΩ	R7,10,12,15,17,22,26,59,62,66,
37				68,121,123,131
38	26-1596-01	3	RFC,3.3kΩ	R51,64,114,
39	26-4268-06	7	RFC,6.8kΩ	R53,104,134,89,93
40				38,42
41	27-0253-93	1	RFMF,121kΩ,±1%,1/4W	R110
42	27-0253-22	1	RFMF,232kΩ,±1%,1/4W	R109
43	26-0109-01	1	RFC,6,8kΩ,±10%,1/2W	R132
44	29-0154-04	3	RVC,1kΩ	R52,86,103
45	29-0154-06	29	RVC,10kΩ	R4,9,14,19,23,27,31,33,37,39,
46				40,43,44,48,56,61,65,69,74,78,
47				82,83,84,88,90,94,99,138,36
48	20-0058-01	1	CFE 6.8μf	C37
49	26-1535-01	1	RFC 1.5k ±5%, 1/4W	R145
50	26-1521-01	1	RFC 33k ±5%, 1/4W	R146
51	29-0154-07	14	RVC,50KΩ	R6,11,16,21,25,29,58,63,67,71,
52				76,80,91,95
53	27-0253-71	2	RFMF,30.1k,±1%,1/4W	R127,130
54	40-0041-01	7	TR, 2N3904	Q2,3,4,5,14,9,16
55	40-0097-01	5	TR, MPS A10	Q1,6,7,8,10
56	40-0101-01	2	TR, 2N 5138	Q12-13
57	41-0053-01	22	DS, IN459	CR1-22
58	43-0043-01	A/R	Wire, Buss #22 Ga.	
59	40-0042-01	1	TR, 2N 3906	Q11
60	45-0020-01	4	ICL,μA 748C	E1-4

-6247
-6247
-6592
-7087
-7122
-7100
-7005

ENG | CHK | BY | NAME | DATE
TPR 57572 | S.T.G. | 2-4-71

TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 494-9401 • TWX 910 596-1320

PARTS LIST

TITLE PCB ASSEMBLY, SIDE BOARD MODEL 1205

REL | SH 2 OF 2 | SIZE A | DWG NO 95-0269-01 | REV

10-6920-36

Figure 5-3B

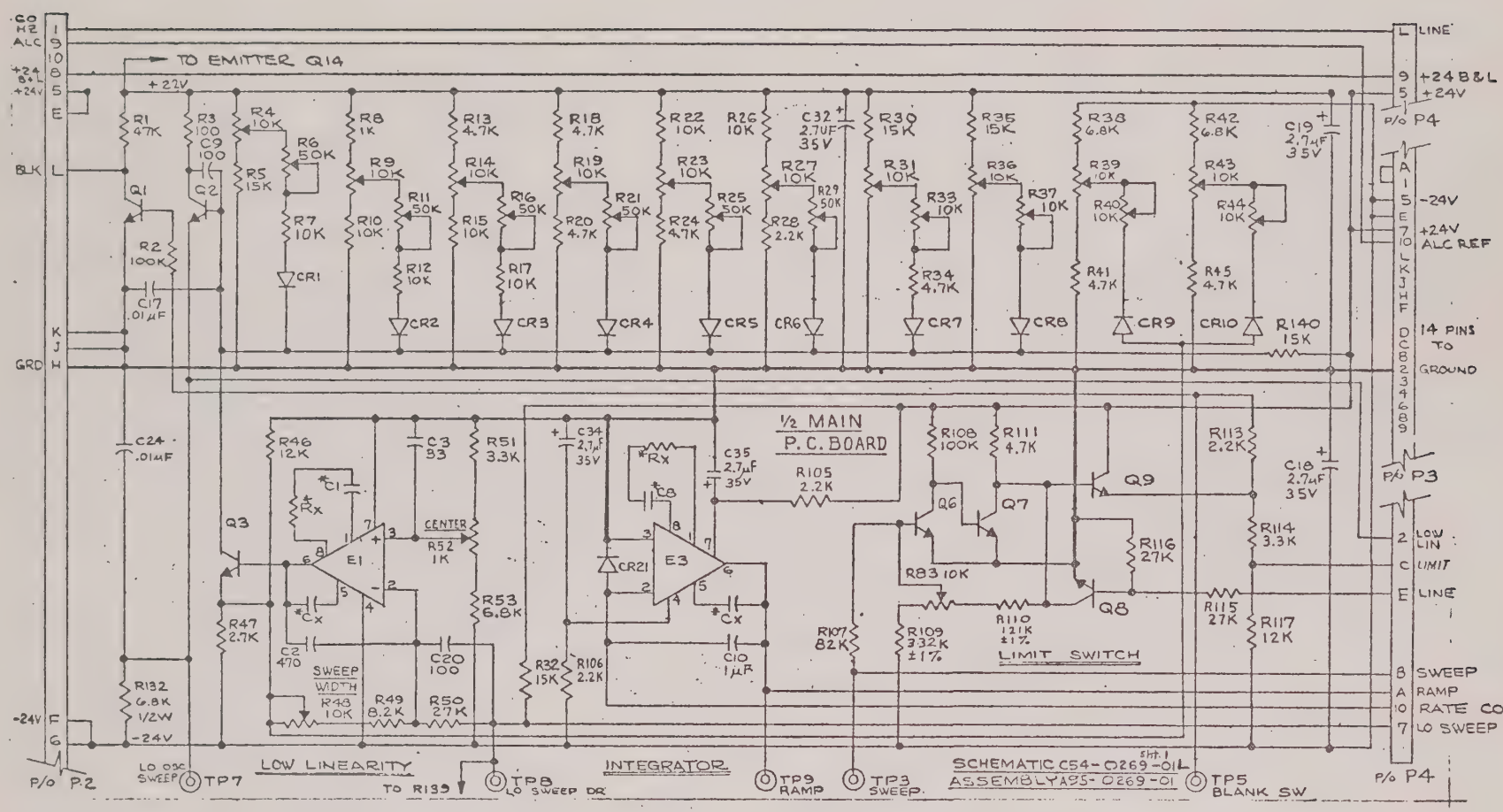


Figure 5-4A

NOTES

UNLESS OTHERWISE SPECIFIED:

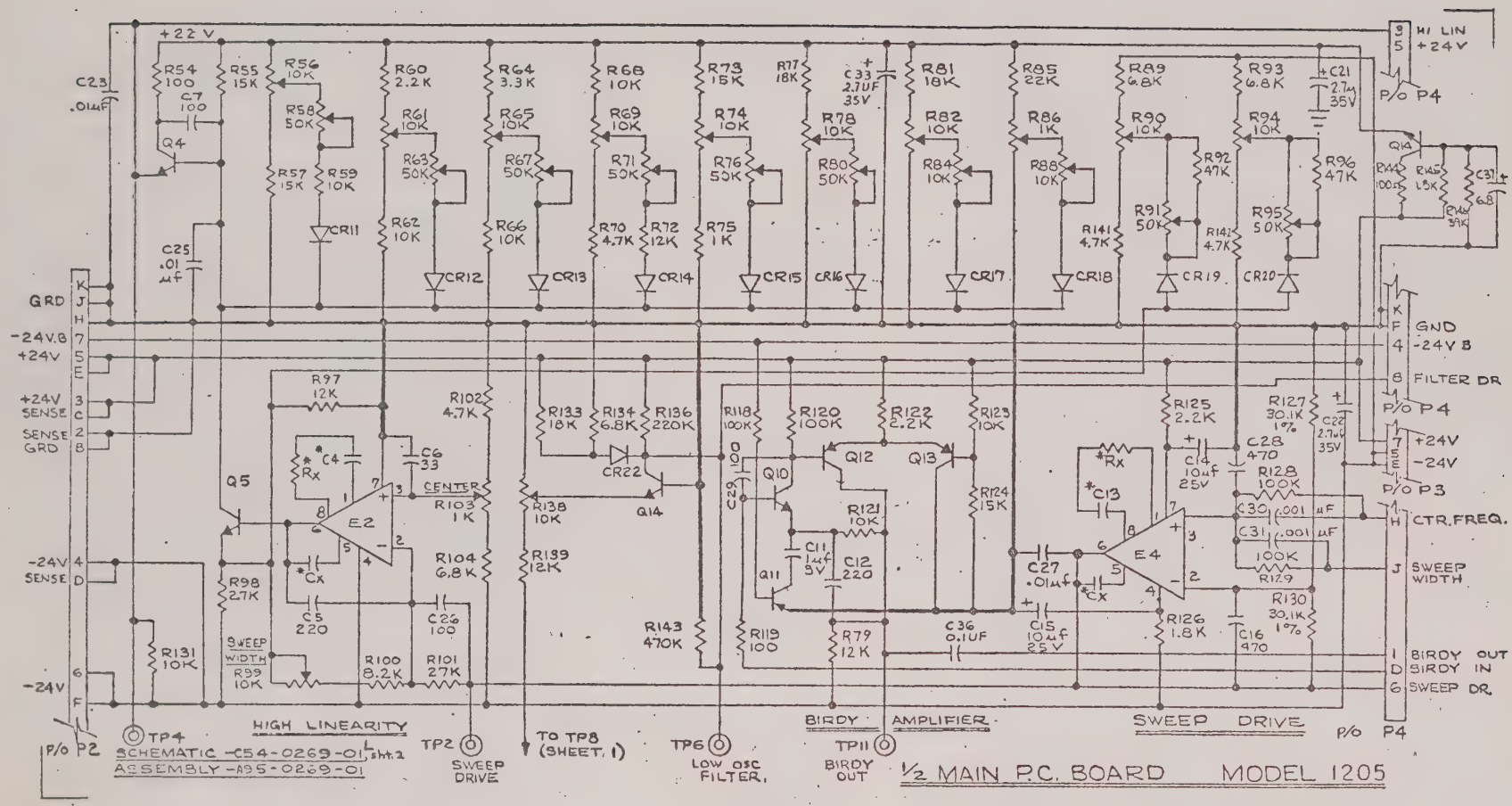
1. RESISTOR VALUES IN OHMS, ±10%, ¼ WATT.
2. CAPACITOR VALUES IN PICOFARADS ±20%, 35V MIN.
3. * I.Cs MAY BE EITHER 709 OR 748 TYPE. USE AUXILIARY COMPONENTS AS FOLLOWS:

DASH NO.	-02	-01
	709	748
C8	470 PF	10 PF
Rx	1.5 K	JUMPER
Cx	20 pf	OPEN
C1,4,13	470 pf	100 pf

TELONIC SYSTEMS

(½) SIDE P.C. BOARD MODEL 1205 SCHEMATIC

TOLERANCES	AQL	SCALE	RELEASED	SHEET 1 OF 2	SIZE C	DRAWING NUMBER 54-0269-01	REV L



NOTES: SEE SHEET 1

TELONIC SYSTEMS	TOLERANCES		SCHEMATIC (½) SIDE P.C. BOARD MODEL 1205		
	FRAC ±	.XX ± .01	RELEASED	SHEET 2 OF 2	SIZE C
	ANG ± 1°	.XXX ± .005			DRAWING NUMBER 54-0269-01
					REV L

Figure 5-4B

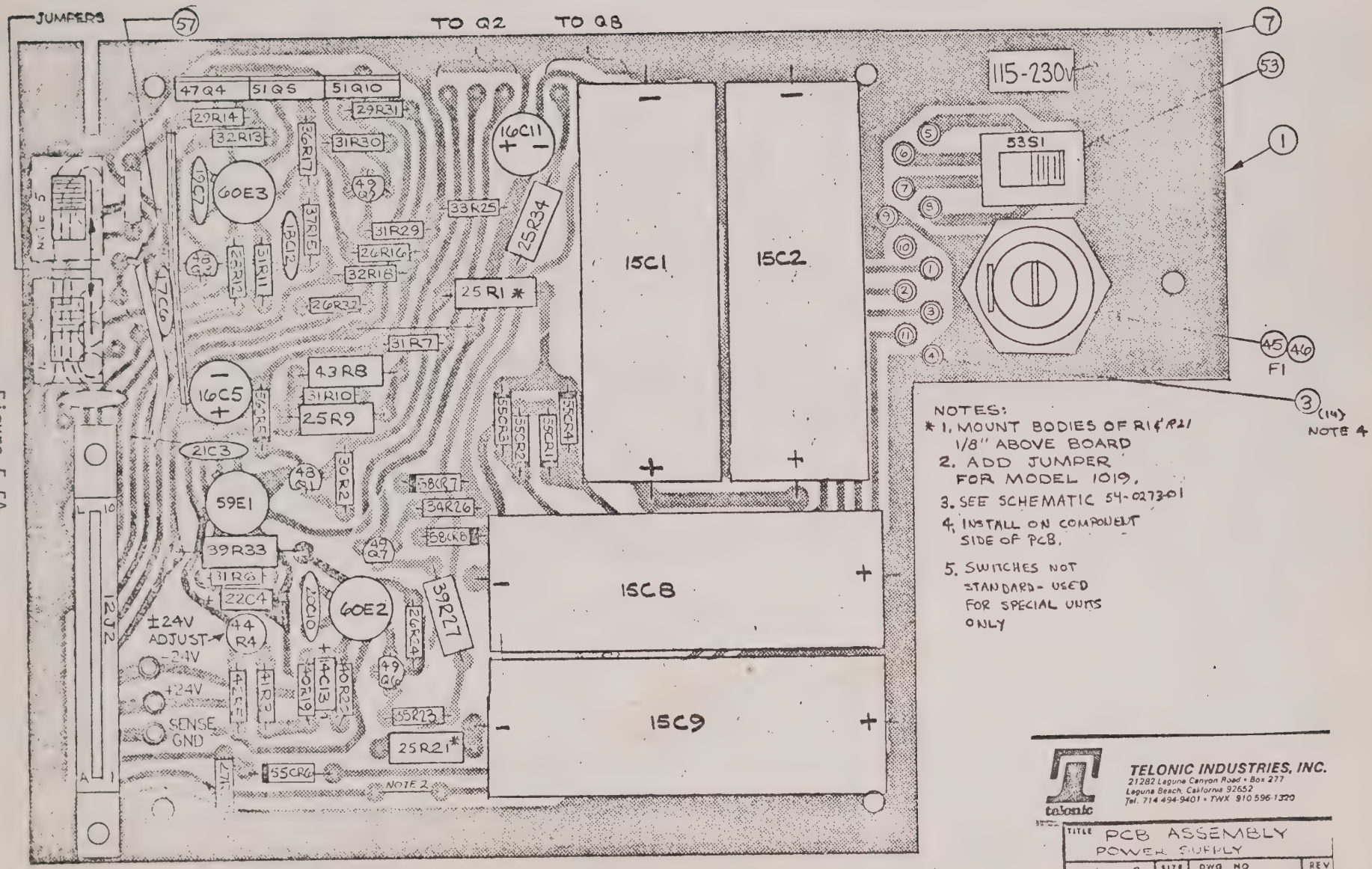


Figure 5-5A

TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel. 714 494-9401 • TWX 910 596-1320

TITLE	PCB ASSEMBLY POWER SUPPLY		
SH 1 OF 2	SIZE B	DWG NO 95-0274-01	REV M
REL 2/24/71			

H-6671
J-7144
K-6918

ITEM	PART NUMBER	QTY -01	DESCRIPTION	CKT REF
1	57-0274-01	1	P.C. Board	
2				
3	09-1504-01	14	Terminal, PCB	
4				
5				
6				
7	11-0290-01	1	Label, 115-230V	
8				
9	00-1045-01	AR	Sleeving, Clear	
10	43-0043-01	AR	Wire, Buss, #22 ga.	
11				
12	44-0102-01	1	Connector	J2
13				
14	20-0064-04	1	CFTA, .22 µF/50V	C13
15	20-0055-01	4	CFE, 500 µF/50V	C1,2,8,9
16	20-0076-01	2	CFE, 50 µF/35V	C5,11
17	22-0055-01	1	CFD, .01 µF	C6
18	22-0189-13	1	CFD, 82 pF	C12
19	22-0002-01	1	CFD, 33 pF	C7
20	22-0001-06	1	CFD, 10 pF	C10
21	22-0168-01	1	CFD, 150 pF	C3
22	22-0193-01	1	CFTA, 15 µF/10V	C4
23				
24				
25	26-0149-01	4	RFC, 1Ω, ±10%, 1/2W	R1,9,21,34
26	26-0159-01	3	RFC, 1.5kΩ, ±10%, 1/4W	R16,24,32
27	26-1518-01	1	RFC, 22kΩ, ±10%, 1/4W	R22
28	26-1527-01	1	RFC, 2.2kΩ, ±10%, 1/4W	R12
29	26-1528-01	2	RFC, 1kΩ, ±10%, 1/4W	R14,31
30	26-1568-01	1	RFC, 1.8kΩ, ±10%, 1/4W	R2
31	26-1594-01	6	RFC, 10kΩ, ±10%, 1/4W	R6,7,10,11,29,30
32	26-1595-01	2	RFC, 5.6kΩ, ±10%, 1/4W	R13,18
33	26-1596-01	1	RFC, 3.3kΩ, ±10%, 1/4W	R25
34	26-4168-06	1	RFC, 680Ω, ±10%, 1/4W	R26
35	26-1623-01	1	RFC, 390Ω, ±10%, 1/4W	R23
36	26-4022-06	1	RFC, 22Ω, ±10%, 1/4W	R17
37	26-4522-06	1	RFC, 2.2MegΩ, ±10%, 1/4W	R15
38				
39	26-0138-01	2	RFC, 1.5kΩ, ±10%, 1/2W	R33,27
40	27-0253-64	2	RFMF, 10kΩ, ±1%	R19,20
41	27-0253-67	1	RFMF, 5.62kΩ, ±1%	R3
42	27-0253-09	1	RFMF, 2.1kΩ, ±1%	R5
43	26-0152-01	1	RFC 4.7Ω, ±10%, 1/2W	R8
44	29-0131-03	1	RVC, 500Ω	R4
45	36-0016-05	1	Fuse, 1A, 3AG	F1
46	36-0035-01	1	Fuse Holder	
47	40-0055-01	1	TR, MJE 371	Q4
48	40-0097-01	2	TR, MPSA10	Q1,3
49	40-0101-01	3	TR, 2N 5138	Q6,7,9
50				
51	40-0104-01	2	TR, 2N 5296	Q5,10
52				
53	37-0170-01	1	Switch DPDT	S1
54				
55	41-0048-01	5	DS, ED 3005/1N 4006/E5	CR1-4,6
56	41-0113-03	1	DSZ, MZ 500-29 (36V)	CR5
57	43-0097-01	2	Coax	
58	41-0022-01	2	DS, IN3064	CR7,8
59	45-0018-01	1	ICL, µA 723C	E1
60	45-0020-01	2	ICL, µA 748C	E2,3

Figure 5-5B

	BY	DATE
CHK		
ENG		
APVD	S.T.G.	12-7-71

NAME

telonic™

TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel.: 714 494-9401 • TWX 910 596-1320

PARTS LIST

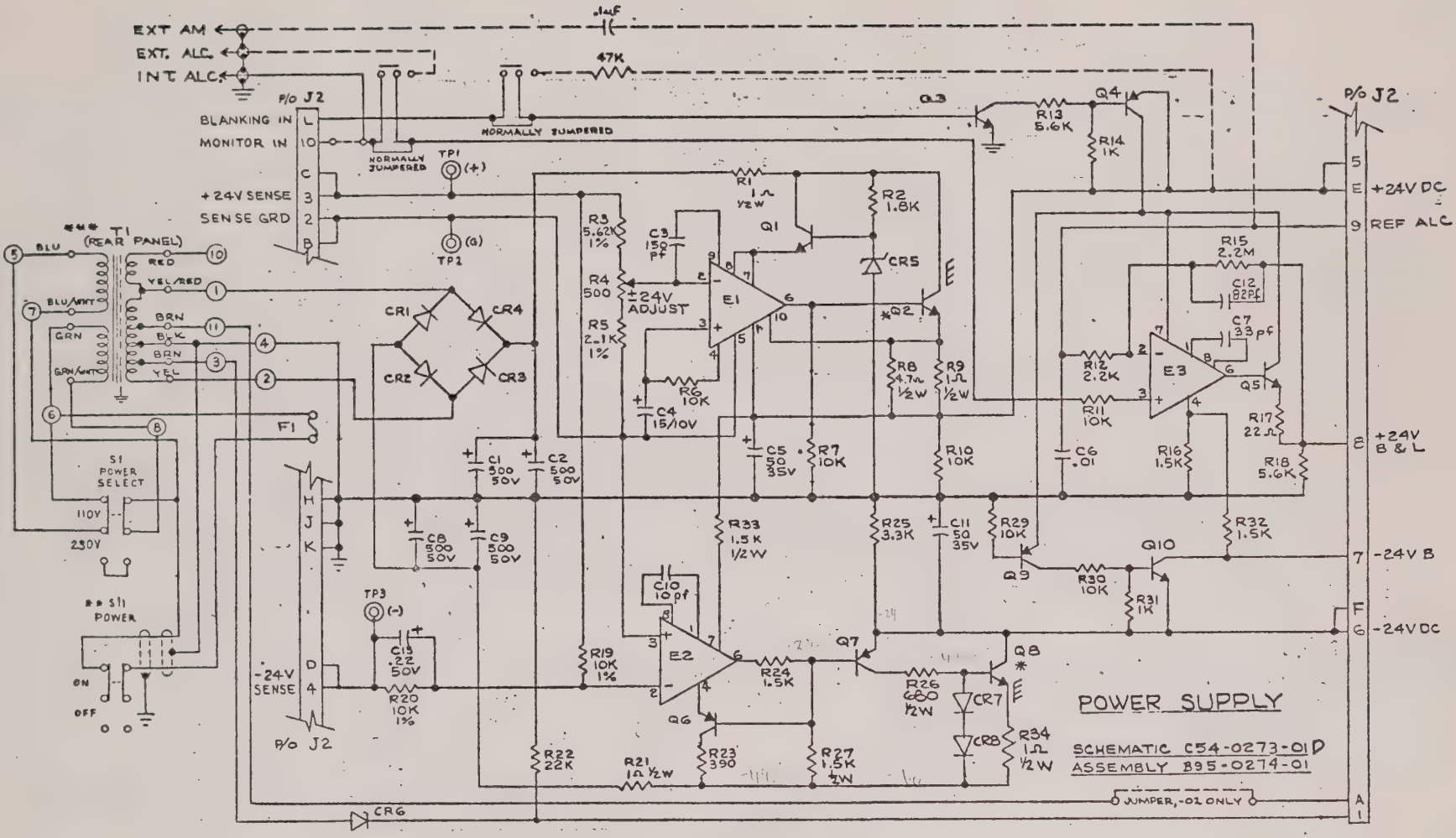
TITLE ASSEMBLY, POWER SUPPLY, PCB

SIZE	DWG NO	REV
A	95-0274-01	W1

REL FM, 2/24/73

SH 2 OF 2

95-0274-01



NOTES:

UNLESS OTHERWISE NOTED:

1. CAPACITOR VALUES IN MICROFARADS
2. RESISTOR VALUES IN OHMS, ±10%, ¼ WATT.
3. * Q2, Q8 ARE TELONIC PART NR 40-0103-01
4. ** S11 IS ON FRONT PANEL-CONTROL ASSEMBLY
5. OPTIONAL FEATURES SHOWN WITH DASHED LINES.
6. *** TRANSFORMER T1 IS TELONIC PART NR 34-0015-01

TELONIC INDUSTRIES	SCHEMATIC, POWER SUPPLY-				
TOLERANCES	AOL	RELEASED	SHEET 1 OF 1	SIZE	DRAWING NUMBER	REV
FRAC ± 1/16	SCALE —			C	54-0273-01	D
ANG ± 1°						

Figure 5-6

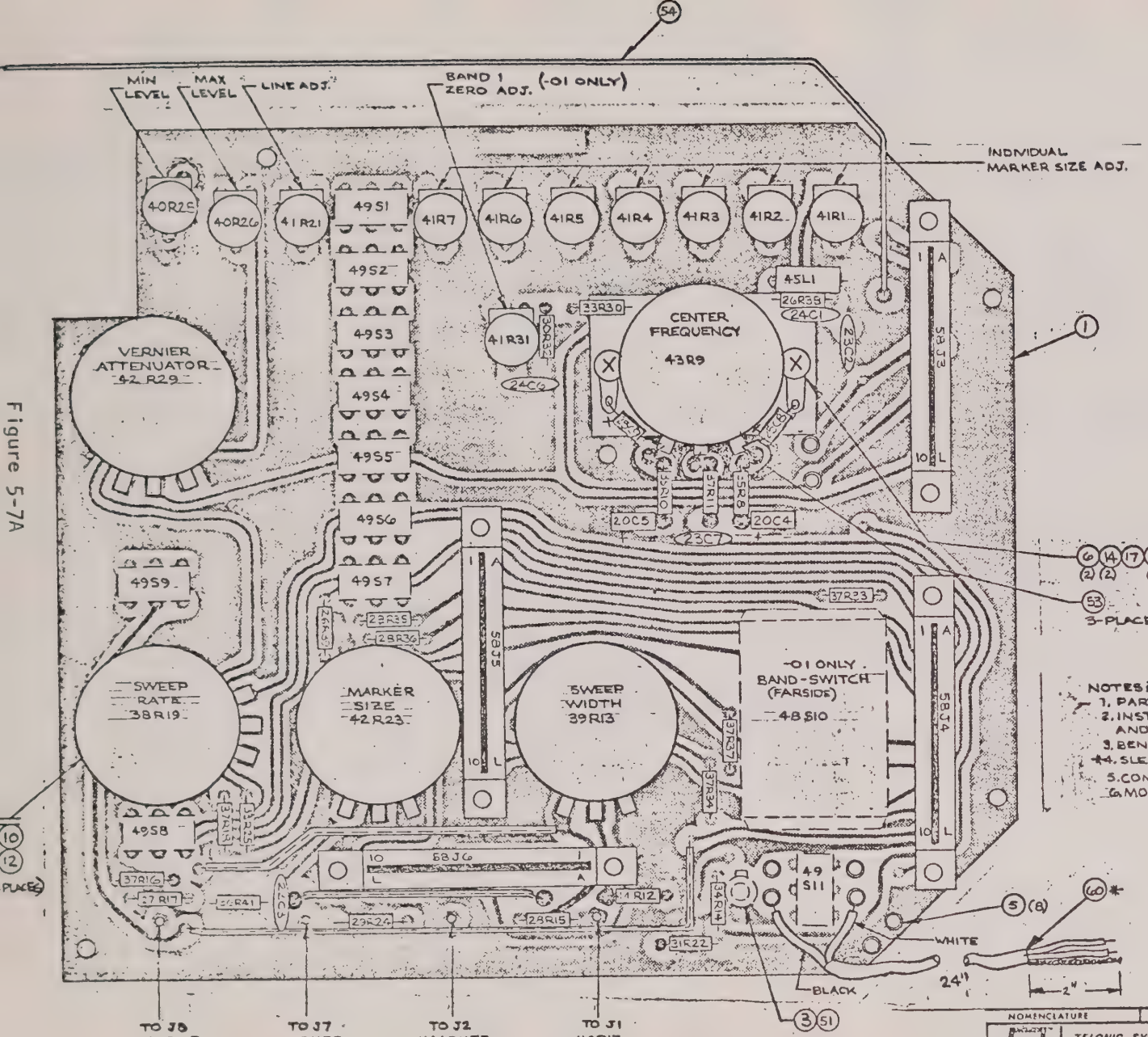

MIN LEVEL
MAX LEVEL
LINE ADJ.
BAND 1 ZERO ADJ. (-01 ONLY)
INDIVIDUAL MARKER SIZE ADJ.
VERNIER ATTENUATOR 42R29
CENTER FREQUENCY 43R9
SWEEP RATE 38R19
MARKER SIZE 42R23
SWEEP WIDTH 39R13
-01 ONLY. BAND-SWITCH (FARSIDE) 48S10
3 PLACES
NOTES:
1. PARTS WITH DASHED OUTLINES, MOUNT FARSIDE.
2. INSTALL PCB KEYS ON J5 BETWEEN PINS 4-5, 6-7, 7-8 AND ON J6 BETWEEN PINS 3-4, 6-7, 7-8. (ITEM 16).
3. BEND TAB ON ITEM 51 DOWNWARDS.
4. SLEEVE GROUND BRAID OF ITEM 60.
5. COMPONENT SIDE CIRCUITRY SHOWN.
6. MOUNT JUMPERS FARSIDE.
WHITE
BLACK
24"
2"
TO J8 EXT SWP IN
TO J7 MARKER ADDER OUT
TO J2 MARKER ADDER IN
TO J1 HORIZ.

Figure 5-7A

NOMENCLATURE	MATL / COMM'L NO.	FINISH / SOURCE	NOTES
TELONIC SYSTEMS	PCB ASSEMBLY FRONT BOARD MODEL 1205,1204		
TOLERANCES	AQL	SCALE	RELEASED	SHEET 1 OF 2	SIZE C	DRAWING NUMBER 95-0272-(1)	REV O

ITEM	PART NUMBER	QTY 01	QTY 02	DESCRIPTION	CKT REF
1	57-0272-01	1	1	PCB, Front Board	
2					NOTE: ( ) denotes
3	00-1070-01	4"	4"	Sleeving	-01 only
4					
5	09-1504-01	8	8	PCB, Terminal	
6	02-7004-04	4	4	Screw, PH #4-40 x 1/4	
7					
8	A03-0205-01	2	2	Spacer, Hex #4-40 x 3/4	
9					
10	03-1003-01	5	5	Lockwasher, Int. #3/8	
11	03-1029-01	2	2	Lockwasher, Ext. #4	
12	03-1502-01	5	5	Nut, Hex, 3/8-32	
13					
14	09-0095-01	2	2	Lug, Solder #4	
15	03-1035-01	2	2	Washer, Flat #4	
16	09-0366-01	6	6	Keying Plug	
17	A09-0489-01	1	1	Plate, Pot Mounting	
18	A96-5178-01	1	1	Drive, Planetary	
19					
20	20-0064-06	2	2	CFTA, 2.7μF, ±20% 35V	C4,5
21					
22	22-0005-01	1	1	CFD, .001μF	C3
23	22-0055-01	2	2	CFD, .01μF	C2,7
24	22-0170-01	2	1	CFD, .1μF	C1,(6)
25	20-0064-02	2	2	CFTA, 4.7/25V	C8,9
26	26-0162-01	2	2	RFC, 270Ω ±10% 1/4W	R38,39
27	26-0159-01	1	1	RFC, 1.5K 10% 1/4W	R17
28	26-1518-01	3	3	RFC, 22KΩ ±10% 1/4W	R15,35, 36
29	26-1524-01	1	1	RFC, 47KΩ ±10% 1/4W	R24
30	26-1527-01	1		RFC, 2.2KΩ ±10% 1/4W	R32
31	26-1529-01	1	1	RFC, 27KΩ ±10% 1/4W	R22
32					
33	26-1584-01	2	1	RFC 3.9KΩ ±10% 1/4W	(R30) 25
34	26-1587-01	1	1	RFC 150Ω ±10% 1/4W	R14
35	26-4268-06	2	2	RFC 6.8KΩ ±10% 1/4W	R8,10
36	26-1549-01	1	1	RFC 1 MegΩ ±5% 1/4W	R41
37	26-1594-01	6	3	RFC 10KΩ ±10% 1/4W	R11,16,18(33,34,37
38	29-0043-05	1	1	RVC, 5 MegΩ (Log Taper)	R19
39	29-0155-04	1	1	RVC, 10K (Log Taper)	R13
40	29-0154-04	2	2	RVC, 1KΩ	R26,28
41	29-0154-06	9	8	RVC, 10KΩ	R1-7 (31), 21
42	A29-0155-02	2	2	RVC, 10KΩ	R23,29
43	A29-0155-03	1	1	RVC, 10KΩ	R9
44	26-1583-01	1	1	RFC, 10Ω ±10% 1/4W	R12
45	32-0038-01	1	1	IF, 1000μH	L1
46					
47					
48	37-0169-01	1		SWS, 4 pole-3 position	S10
49	37-0170-01	10	10	SWS, DPDT	S1-9, 11
50					
51	41-0118-01	1	1	DS, Light emitting, red	LED-1
52					
53	43-0043-01	4"	8"	Wire, Buss. #22 ga.	
54	43-0090-09	1	1	Wire, Hook-up #28 ga. Grn	
55					
56					
57					
58	44-0102-01	4	4	Connector, PCB	J3-6
59					
60	43-0109-01	24"	24"	Cable Coax 2 cond. #24 ga	

Figure 5-7B

	BY	NAME	DATE
ENG			
CHK	JG		3/22/73
APVD			

TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 494-9401 • TWX: 910 596-1320

PARTS LIST

TITLE: ASSEMBLY PCB - FRONT BOARD

REL	SH 2 OF 2
SIZE	DWG NO
A	95-0272-( )
	REV

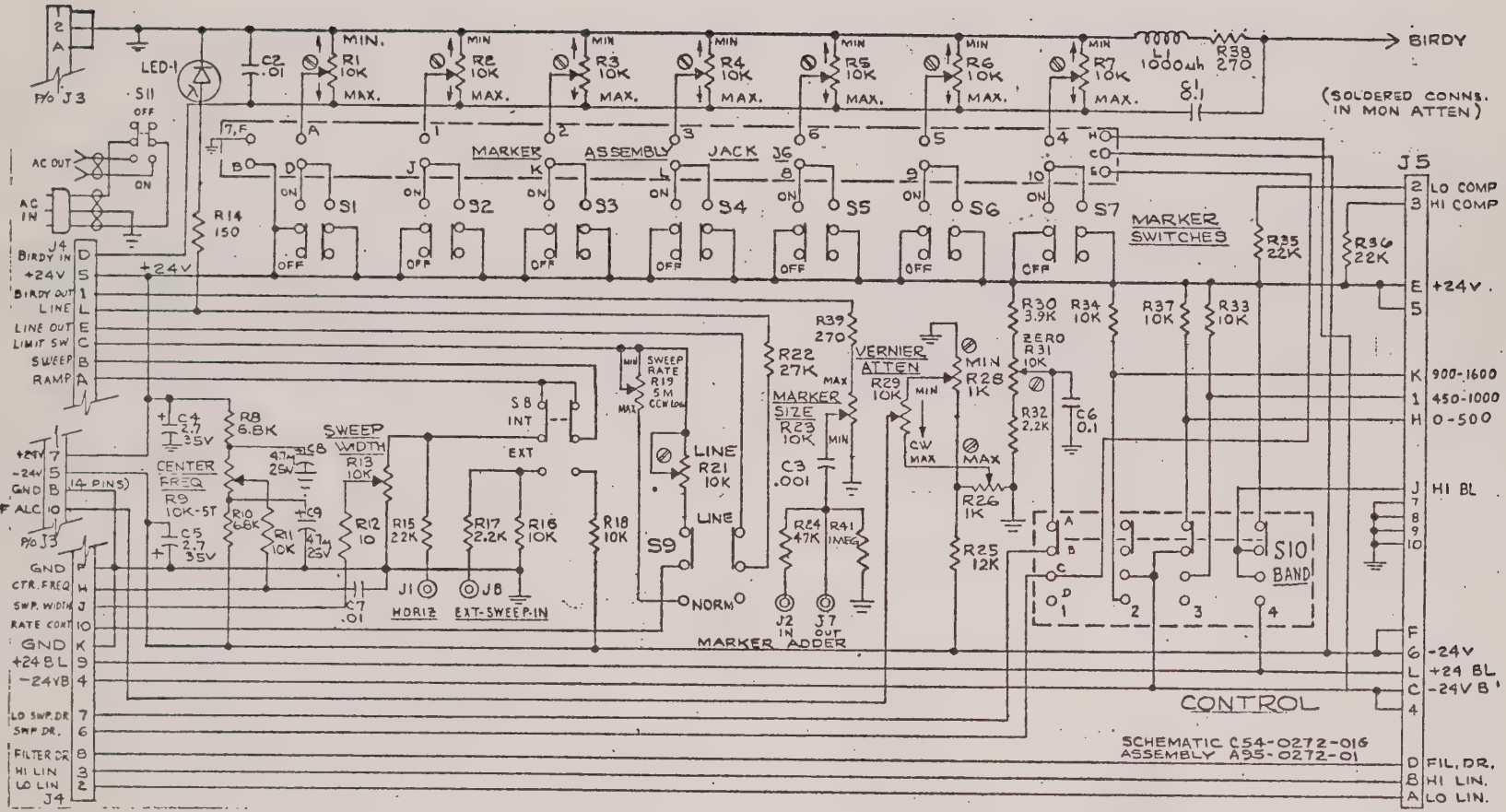


Figure 5-8

NOTES:

UNLESS OTHERWISE SPECIFIED:

1. CAPACITOR VALUES IN MICROFARADS, ±20%, 50V OR GREATER.
2. RESISTOR VALUES IN OHMS, ±10%, 1/4 WATT.
3. GROUND PINS ON J3 ARE 2,3,4,6,8,9,10,B,C,D,E,F,H,J,K,& L.

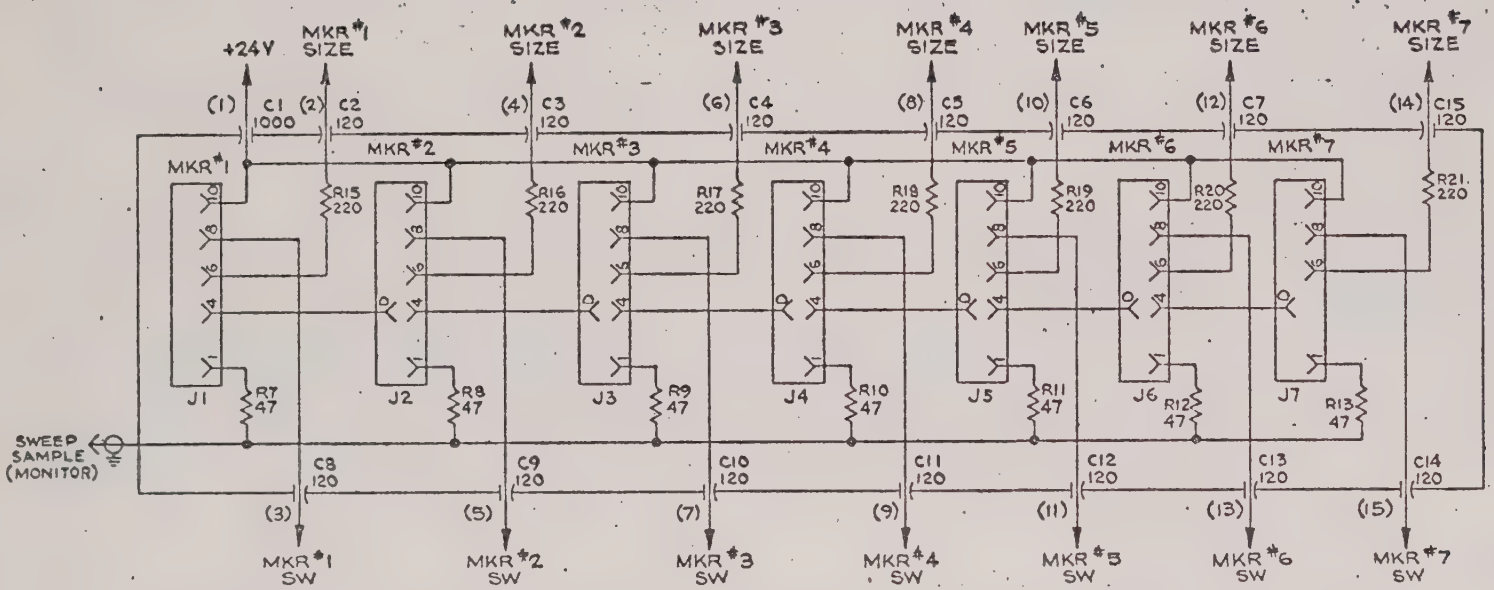
TELONIC INDUSTRIES	SCHEMATIC FRONT BOARD	
TOLERANCES: FRACT ± 1/64, AND ± .1°, .XX ± .01, .XXX ± .005	SCALE —	RELEASED, SHEET 1 OF 1
	SIZE C	DRAWING NUMBER 54-0272-01 REV G

Electrical Parts List

Fixed Marker (Assembly No. 97-1082-01)

Circuit Ref	Description	Telonic Part No.
C1	CFCF, 1000pF	21-0016-01
C2	CFCF, 120pF	21-0020-01
C3	Same as C2	
C4	Same as C2	
C5	Same as C2	
C6	Same as C2	
C7	Same as C2	
C8	Same as C2	
C9	Same as C2	
C10	Same as C2	
C11	Same as C2	
C12	Same as C2	
C13	Same as C2	
C14	Same as C2	
C15	Same as C2	
J1	Connector P.C.B.	44-0102-01
J2	Same as J1	
J3	Same as J1	
J4	Same as J1	
J5	Same as J1	
J6	Same as J1	
J7	Same as J1	
R7	RFC, 47Ω, 1/8W, 10%	26-3003-01
R8	Same as R7	
R9	Same as R7	
R10	Same as R7	
R11	Same as R7	
R12	Same as R7	
R13	Same as R7	
R14	Not assigned	
R15	RFC, 220Ω, 1/4W, 10%	26-1501-01
R16	Same as R15	
R17	Same as R15	
R18	Same as R15	
R19	Same as R15	
R20	Same as R15	
R21	Same as R15	

Figure 5-9



INTERCONNECTION SCHEMATIC
FIXED MARKER MODEL 4053
SCHEMATIC NO.C55-8573-01
ASSY NO.C97-1082-()

Figure 5-10

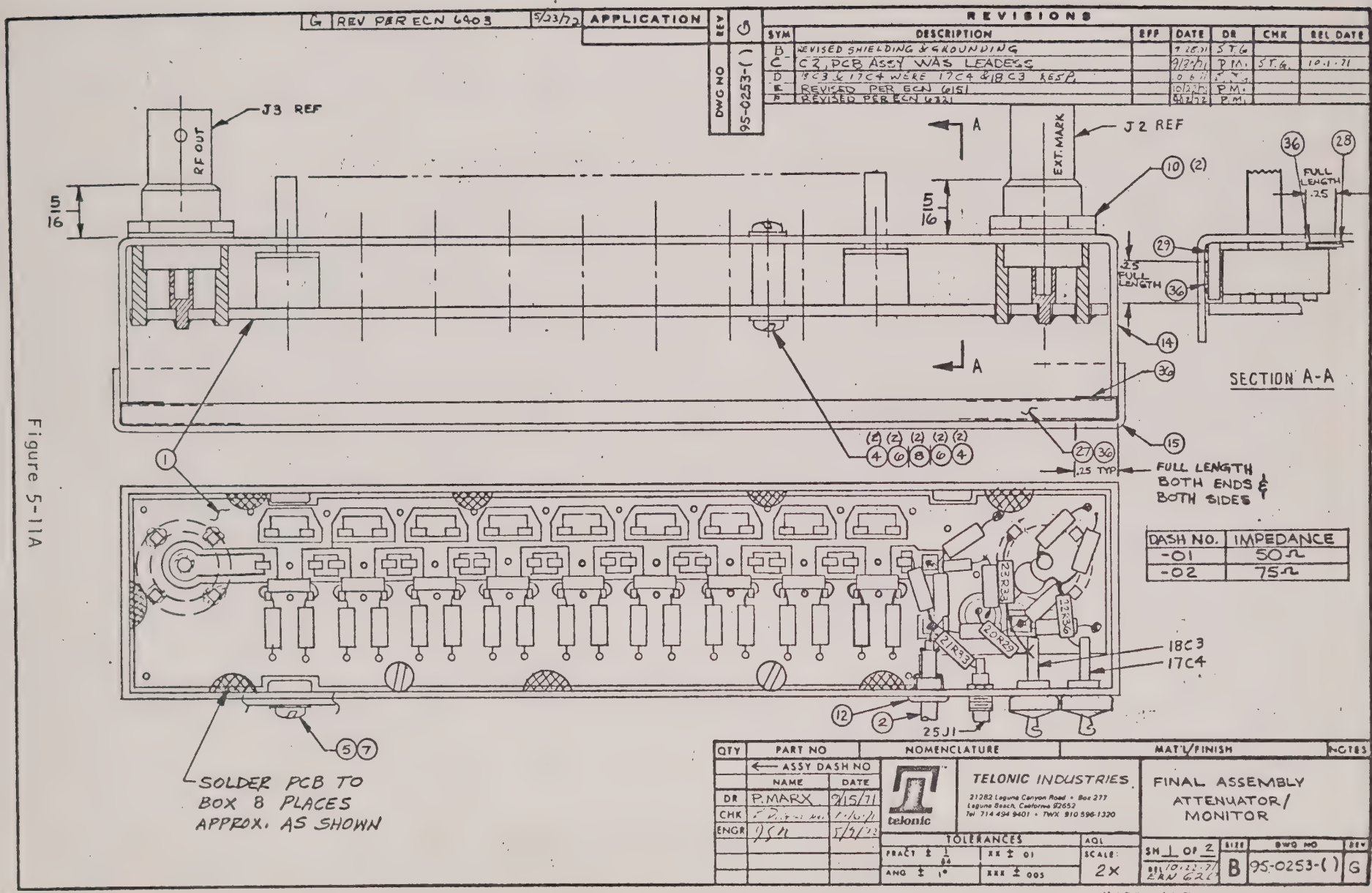


Figure 5-11A

FORM 89302

E-6151 ✓
E-6321
E-6403

ITEM	PART NUMBER	QTY 01	QTY 02	DESCRIPTION	CKT REF
1	95-0257-01	1		Assembly, P.C.B.	
2	97-9496-03	1	1	Assembly, Cable	
3	95-0257-02		1		
4	02-7002-03	4	4	Scr., B.H., #2-56 x 3/16	
5	02-7004-03	4	4	Scr., B.H., #4-40 x 3/16	
6	03-1025-01	4	4	Lockwasher, Int., #2	
7	03-1028-01	4	4	Lockwasher, Int., #4	
8	03-0100-01	2	2	Spacer, #2-56 x 3/8	
9					
10	03-1503-01	2	2	Nut, Hex, 15/32-32	
11					
12	09-0430-02	1	1	Eyelet	
13					
14	B13-0599-01	1	1	Box, Attenuator/Monitor	
15	B13-0600-01	1	1	Cover, Attenuator/Monitor	
16					
17	21-0016-01	1	1	CFCF, 1000 pF, ±10%, 500V	C4
18	21-0020-01	1	1	CFCF, 120 pF, ±10%, 500V	C3
19					
20	26-1501-01	1	1	RFC, 220Ω, ±10%, 1/4W	R29
21	26-1503-01	1	1	RFC, 470Ω, ±10%, 1/4W	R33
22	26-1528-01	1	1	RFC, 1kΩ, ±10%, 1/4W	R36
23	26-1526-01	1	1	RFC, 56kΩ, ±10%, 1/4W	R38
24					
25	A44-0078-01	1	1	Connector	J1
26					
27	A09-4551-02	1	1	Pad, Shield Compression	
28	A09-4551-03	1	1	Pad, Shield Compression	
29	A09-4551-04	1	1	Pad, Shield Compression	
30					
31					
32					
33					
34					
35					
36	00-3201-33	A/R		.001 Brass Shim Stock	
37					
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Figure 5-11B

	BY	NAME	DATE
APVD			
ENG			
CHK	KH	P.MARX	9/16/71
			9/25/71

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TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel.: 714 494-9401 • TWX: 910 596-1320

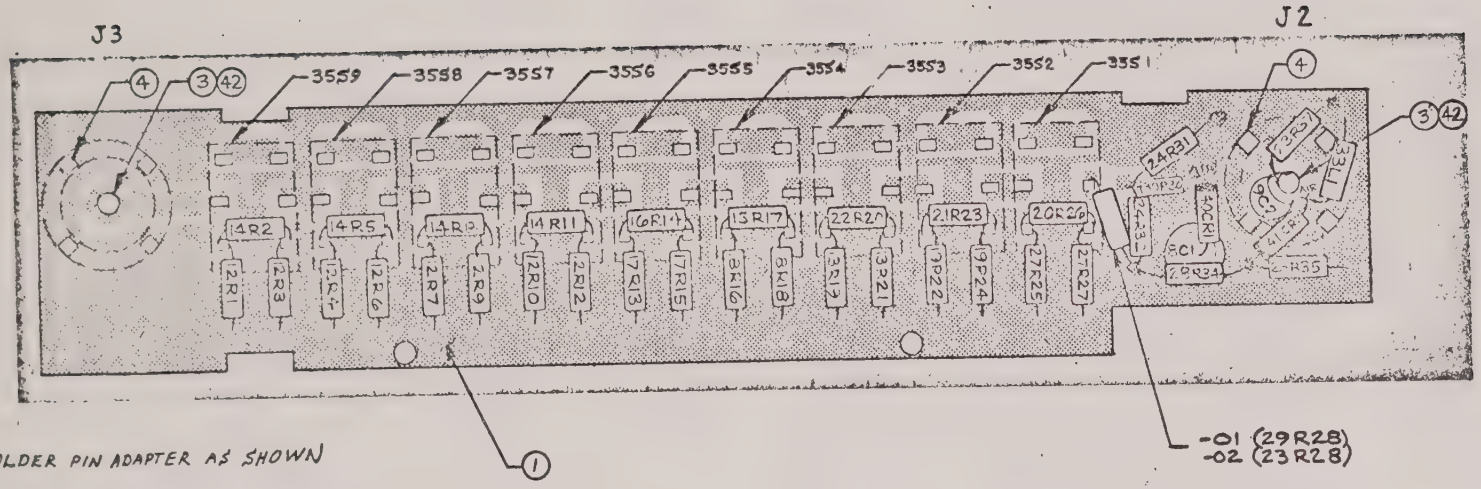
PARTS LIST

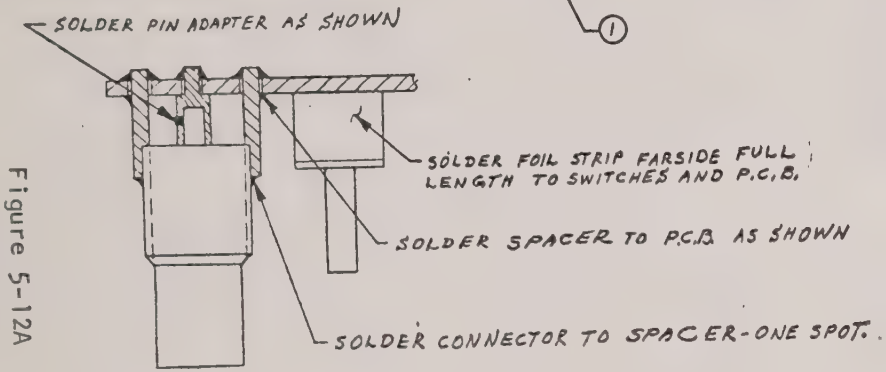
TITLE ASSEMBLY, ATTENUATOR/MONITOR,

REL	SH 2 OF 2
10,22,71 ERN 629	

SIZE	DWG NO	REV
A	95-0253-( )	G

950253




SOLDER PIN ADAPTER AS SHOWN
SOLDER FOIL STRIP FARSIDE FULL LENGTH TO SWITCHES AND P.C.B.
SOLDER SPACER TO P.C.B. AS SHOWN
SOLDER CONNECTOR TO SPACER-ONE SPOT.

DASH	IMPEDANCE
-01	50Ω
-02	75Ω

NOMENCLATURE	MAT'L/FINISH	NOTES
telonic — TELONIC INDUSTRIES, 21282 Laguna Canyon Road • Box 277, Laguna Beach, California 92652, Tel 714 494-9401 • TWX 910 596-1320	PCB ASSY · ATTENUATOR/ MONITOR	

TOLERANCES		AQL	SCALE	SH 1 OF 2	SIZE	DWG NO.	REV
FRACT ± 1/64	XX ± .01		≈2X	REL 10.22.71 ENG GZO	B	95-0257-( )	E
ANG ± 1°	XXX ± .005						

Figure 5-12A

D-6151 ✓
E-6839

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	57-0257-03	1	P.C. Board	
2				
3	A09-4573-01	2	Adapter, Connector Pin	
4	A09-4574-01	2	Spacer, Connector, Attenuator	
5				
6				
7				
8	21-0045-01	1	CFD, Solder-In, 100 pF	C1
9	22-0002-05	1	CEC, 47pF	C2
10				
11				
12	26-4062-05	8	RFC, 62Ω, ±5%, 1/4W	R1,3,4,6,7,9,10,12
13	26-0167-01	2	RFC, 300Ω, ±5%, 1/4W	R19,21
14	26-0169-01	4	RFC, 240Ω, ±5%, 1/4W	R2,5,8,11
15	26-1573-02	1	RFC, 36Ω, ±5%, 1/4W	R17
16	26-1574-01	1	RFC, 68Ω, ±5%, 1/4W	R14
17	26-1558-01	2	RFC, 100Ω, ±5%, 1/4W	R13,15
18	26-1575-01	2	RFC, 150Ω, ±5%, 1/4W	R16,18
19	26-1612-01	2	RFC, 430Ω, ±5%, 1/4W	R22,24
20	26-4005-65	1	RFC, 5.6Ω, ±5%, 1/4W	R26
21	26-4012-05	1	RFC, 12Ω, ±5%, 1/4W	R23
22	26-4018-05	1	RFC, 18Ω, ±5%, 1/4W	R20
23	26-1502-01	2	RFC, 56Ω, ±10%, 1/4W	R35,37
24	26-1600-01	2	RFC, 180Ω, ±10%, 1/4W	R31,32
25				
26	26-1503-01	1	RFC, 470Ω, ±10%, 1/4W	R33
27	26-4191-05	2	RFC, 910Ω, ±5%, 1/4W	R25,27
28	26-1528-01	1	RFC, 1kΩ, ±10%, 1/4W	R34
29	26-1572-01	1	RFC, 22Ω, ±10%, 1/4W	R28
30	26-3020-01	1	RFC, 56Ω, ±10%, 1/8W	R30
31				
32				
33	32-0029-01	1	IF, 470μH	L1
34				
35	37-0170-01	9	SWS, DPDT	S1-9
36				
37				
38				
39				
40	A41-0015-01	1	DS, 1N 82AS	CR1
41	A41-0015-04	1	DS, 1S2198	CR2
42	44-0010-01	2	Connector	J2, 3
43				
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60				

	NAME	DATE
BY	KH	9/16/71
CHK	S.T. GOLDMAN	9.16.71
ENG		

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PARTS LIST

TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 494-9401 • TWX 910 596-1320

TITLE ASSEMBLY, PCB, ATTENUATOR/ MONITOR - - 50Ω

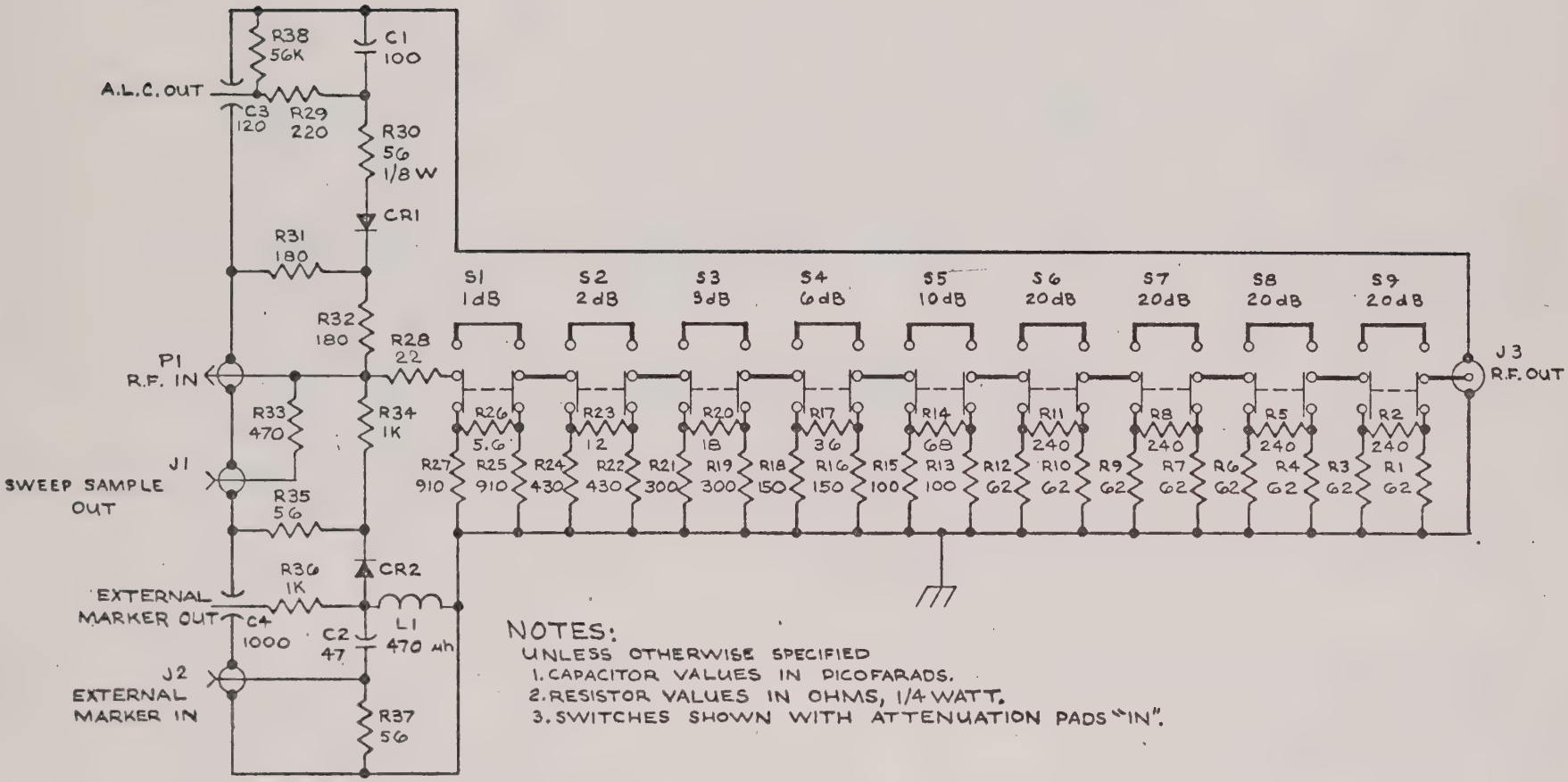
SIZE	DWG NO	REV
A	95-0257-01	E

SH 2 OF 3

REL 10,22,71

95-0257-01

Figure 5-12B



NOTES:
UNLESS OTHERWISE SPECIFIED
1. CAPACITOR VALUES IN PICOFARADS.
2. RESISTOR VALUES IN OHMS, 1/4 WATT.
3. SWITCHES SHOWN WITH ATTENUATION PADS "IN".

Figure 5-13

TELONIC INDUSTRIES, INC. 21282 Laguna Canyon Road • Box 277 Laguna Beach, California 92652 Tel 714 494-9401 • TWX 910 596-1320	TITLE SCHEMATIC ATTENUATOR / MONITOR			
	SH 1 OF 1	SIZE	DWG NO	REV
	REL 10-6-71	B	54-0253-01	C

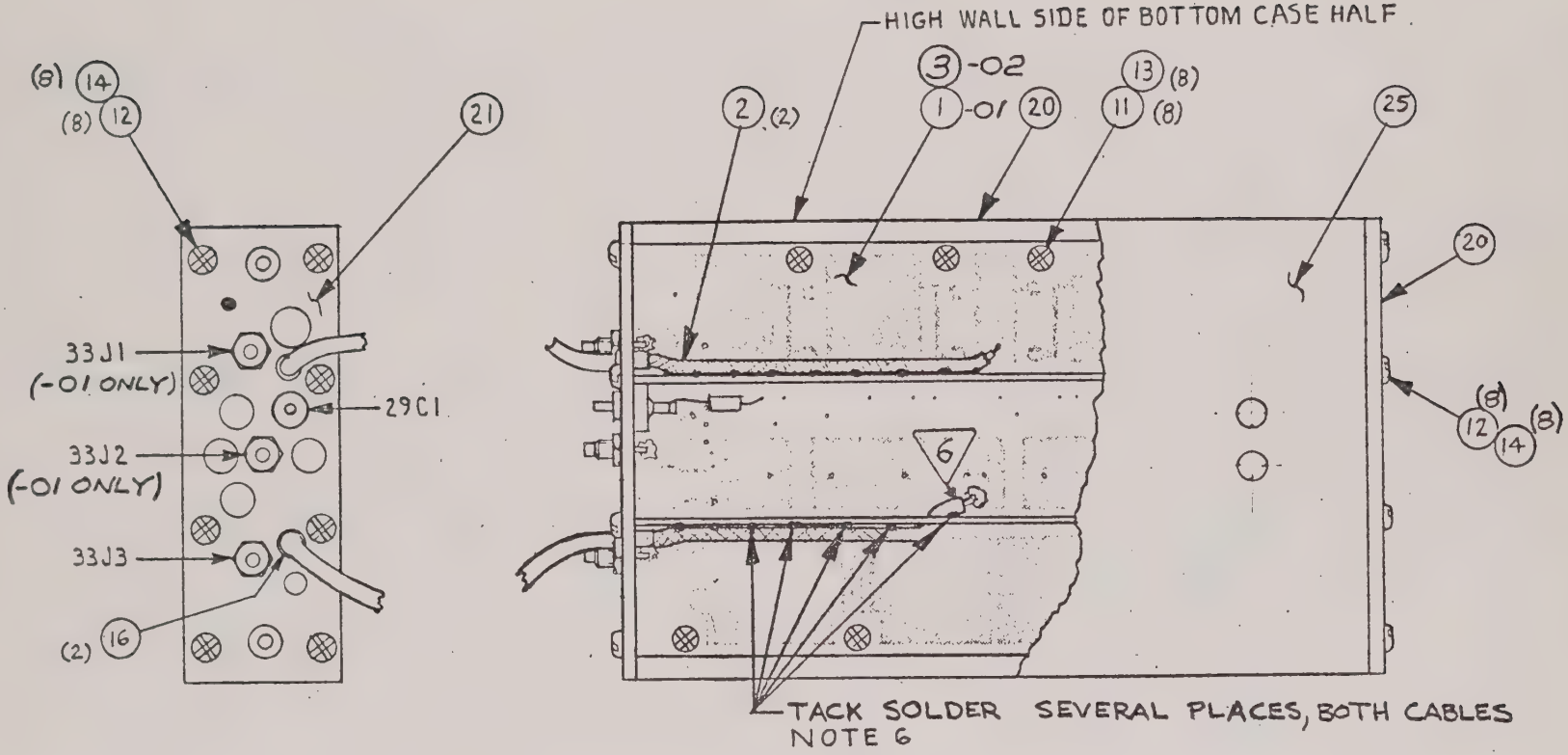


Figure 5-14A

NOTES:

1. INSERT 4 - 3" PIECES OF ITEM 8 INTO CENTER SLOTS OF CASE HALVES TO WITHIN 1/4" OF CONN. END.
2. ASSEMBLY P.C.B. ASSY., BOTTOM CASE HALF (WITH ITEM 8), AND END PLATES.
3. SOLDER CONNECTOR PINS TO P.C.B.
4. SOLDER INDUCTOR & RESISTORS TO FEED-THRU CAPACITORS.
5. ASSEMBLE CABLES & EYELETS TO BOTTOM END PLATE.
6. CABLE SHIELDS MUST TERMINATE NO MORE THAN 1/16" ABOVE P.C.B.
7. ASSEMBLE TOP CASE HALF.

TITLE	ASSY, MODULE-R.F. DISTRIBUTION, MIXER & COMBINER (R.D.M.C.)		
SH 1 OF 2	SIZE	DWG NO	REV
REL 10.12.71 CRAF 620	A	95-0259-( )	A

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ITEM	PART NUMBER	QTY -01	QTY -02	DESCRIPTION	CKT REF
1	95-0260-01	1		Assembly, P.C.B.	
2	97-9496-04	2	2	Assembly, Cable	
3	95-0260-02		1	Assembly, P.C.B.	
4					
5					
6					
7					
8	09-0731-01	AR	AR	Material, RFI Gasket	
9					
10					
11	02-7204-04	8	8	Scr.,Fil,Hd.,#4-40 x 1/4	
12	02-7004-04	16	16	Scr.,B.H.,#4-40 x 1/4	
13	03-1033-01	8	8	Lockwasher, Spring, #4	
14	03-1028-01	16	16	Lockwasher, Int., #4	
15					
16	09-0430-02	2	2	Eyelet, SE-48	
17					
18					
19					
20	14-0681-01	1	1	End Plate, Blank	
21	14-9022-01	1	1	End Plate, Special	
22					
23					
24	15-0205-03	1	1	Housing, Module, Half	
25	15-0245-02	1	1	Cover, Module, Top	
26					
27					
28					
29	21-0020-01	1	1	CFCF, 120pF	C1
30					
31					
32					
33	44-0078-01	3	1	Receptacle, Bulkhead (RF)	J1-3 ; -02 (J3)
34					
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BY
CHK
ENG

NAME
TPR

DATE
3/27/73

Telonic

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Laguna Beach, California 92652
Tel: 714 494-9401 • TWX: 910 596-1320

PARTS LIST

TITLE ASSEMBLY, MODULE, R.F. DISTRIBUTION, MIXER & COMBINER

SH 2 OF 2
REL

SIZE A
DWG NO 95-0259-( )
REV

Figure 5-14B

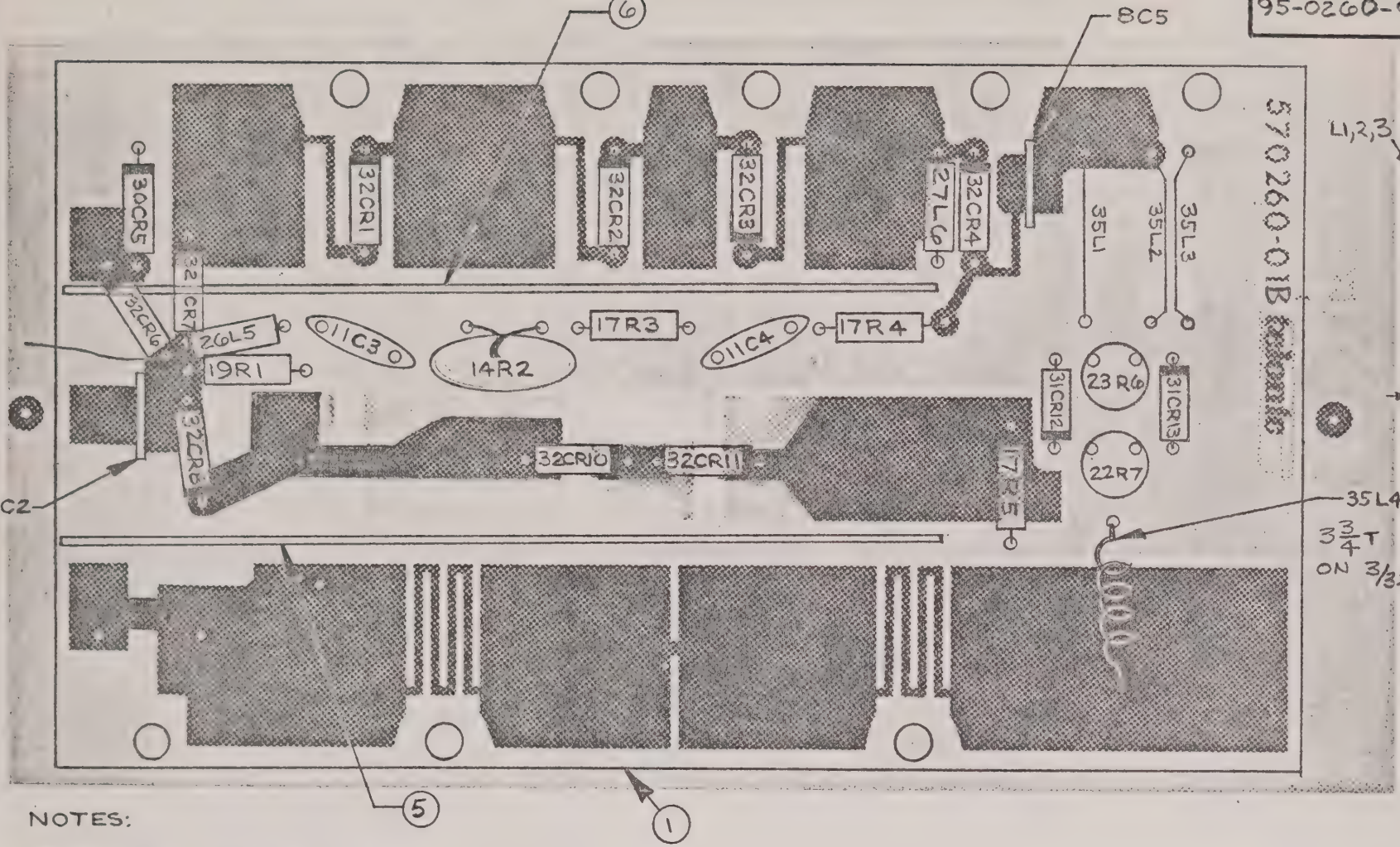

Figure 5-15A

NOTES:

1. TOP SIDE CIRCUITRY SHOWN.
2. SHIELDS TO BE PERPENDICULAR TO PCB.
3. USE ITEM 2 TO INSTALL ITEMS 5,6,8,9.

LET	REVISION	DATE
D	REV ECN 6622 P.M.	7/14/72
C	REV ECN 6383	5/9/72
B	REV SHT. 2 ECN 6377	5/4/72
A	REV. PER ECN 6194 S.T.G.	12.1.71

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	P. MARX	9/17/71
.XX ± .01	CHK		
.XXX ± .005	ENGR		
ANG. ± 1°	APVD		

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TITLE PCB ASSY. R.F. DISTRIBUTION, MIXER & COMBINER MODULE

SH 1 OF 3	SIZE	DWG NO	REV
REL 10-22-71 CRN 6220	A	95-0260-01	D

A-6194V
B-6377
D-6622

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	57-0260-01	1	P.C. Board	
2	01-0403-01	AR	Solder, 2% Silver	
3				
4				
5	15-9007-01	1	Shield	
6	15-9007-02	1	Shield	
7				
8	21-0045-01	1	CF, Solder-In, 100 pF	C5
9	21-0041-01	1	CF, Solder-In, 5000 pF	C2
10				
11	22-0038-01	2	CFD, 100 pF	C3,4
12				
13				
14	25-0016-01	1	RVV	R2
15				
16				
17	26-1501-01	3	RFC, 220Ω, ±10%, 1/4W	R3,4,5
18				
19	26-4168-06	1	RFC, 680Ω, ±10%, 1/4W	R1
20				
21				
22	29-0131-05	1	RVC, 50Ω	R7
23	29-0131-06	1	RVC, 200Ω	R6
24				
25				
26	32-0021-01	1	IF, 4.7 µH	L5
27	32-0040-01	1	IF, .47 µH	L6
28				
29				
30	41-0032-01	1	DS, 1N 100	CR 5
31	41-0111-01	2	DS, HPA-5082-2800	CR12,13
32	41-0115-01	9	DS, HPA-5082-3080	CR1-4,6,7,8,10,11
33				
34				
35	43-0091-10	AR	Wire, Solderable, #24 ga.	L1,2,3,4
36				
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Figure 5-15B

APVD | ENG | CHK | BY: KH | NAME | DATE: 9/16/71

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Laguna Beach, California 92652
Tel: 714 494-9401 • TWX: 910 596-1320

PARTS LIST

TITLE: ASSEMBLY, PCB, R.F. DISTRIBUTION, MIXER, & COMBINER, MODEL 4053

SH 2 OF 2

REL 10,22,71 ERN 620

SIZE: A

DWG NO: 95-0260-01

REV: D

95-0260

APPLICATION	REV	A
	DWG NO	54-0259-01

REVISIONS

SYM	DESCRIPTION	EFF	DATE	DR	CHK	REL DATE
A	REVISED—DELETE CR9 ECN 6622		7/14/72	P.M.		

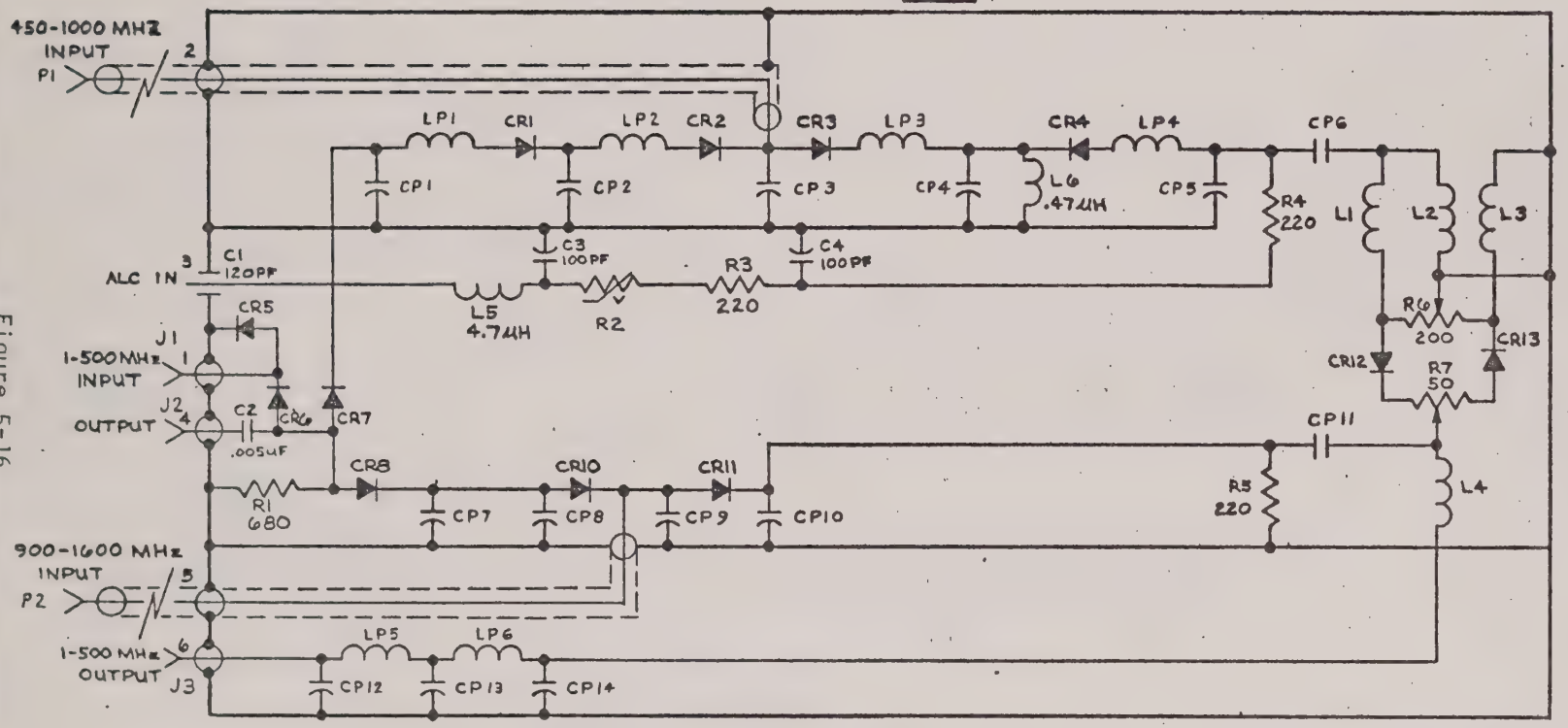


Figure 5-16

QTY	PART NO	NOMENCLATURE	MAT'L/FINISH	NOTES
	← ASSY DASH NO			

	NAME	DATE
DR	P. MARX	9/20/71
CHK		
ENGR		

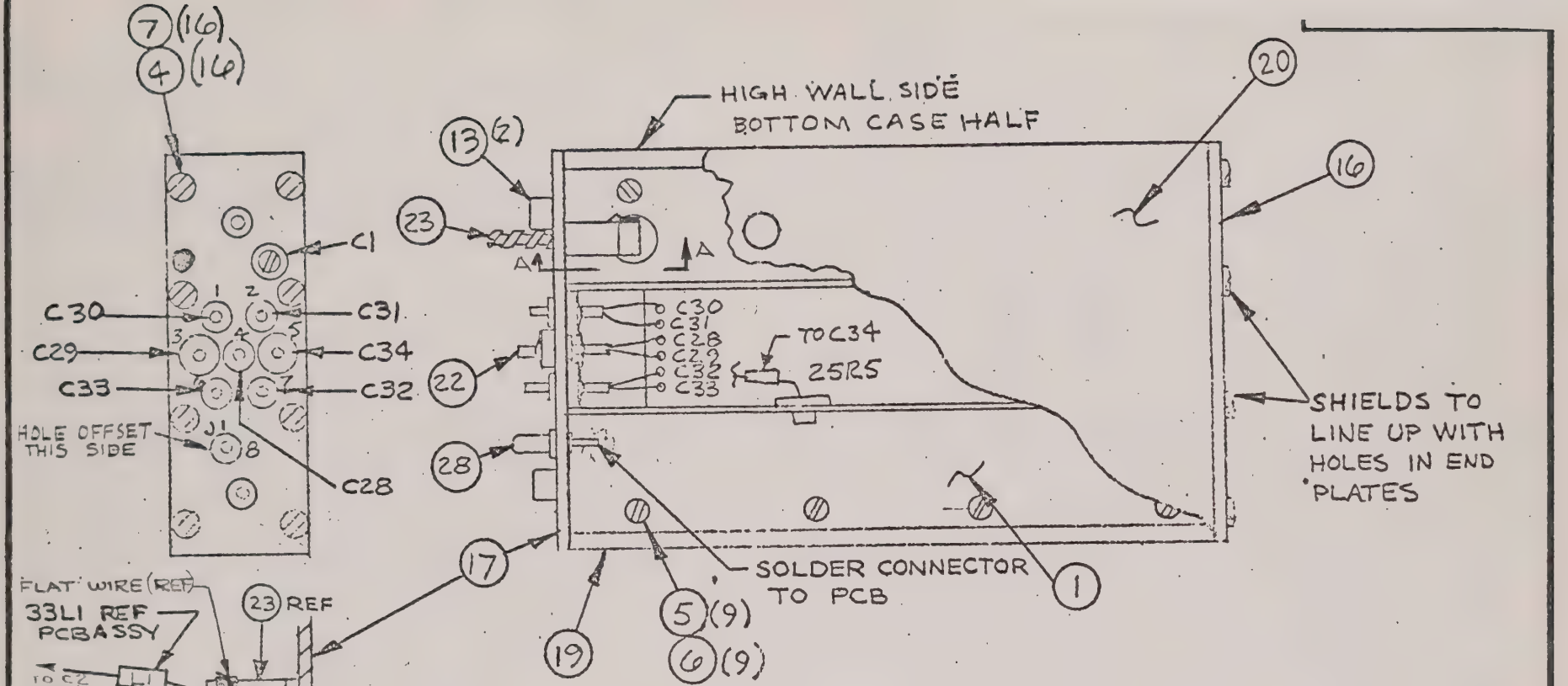
TELONIC INDUSTRIES
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel 714 494-9401 • TWX 910 596-1320

TOLERANCES
FRACT ± 1/64 | XX ± .01 | AOL
ANG ± 1° | XXX ± .005 | SCALE

SCHEMATIC
R.F. DISTRIBUTION, MIXER & COMBINER MODULE

SH 1 OF 1 | SIZE B | DWG NO 54-0259-01 | REV A
REL 10.22.71 ERN 6220

FORM 89302



NOTES:

1. INSERT 3" ITEM 10 INTO BOTH CENTER SLOTS OF EACH CASE HALF TO WITHIN 1/4" OF CONNECTOR END.
2. ASSEMBLE PCB, BOTTOM CASE HALF AND END PLATES.
3. SOLDER PCB SHIELDS TO END PLATE.
4. SOLDER CONNECTOR PIN TO THE PCB.
5. WIRE FEEDTHRUS TO PCB.
6. ASSEMBLE TOP CASE HALF.
7. SEE SCHEMATIC NO. 54-0279-01.
8. ASSEMBLE STRAP (ITEM 31) TO WITHIN 1/64" OF TRANSISTOR (Q1) BODY

Figure 5-17A

LET	REVISION	DATE
P	ADD NOTE 8 ECP #7186	12-29-72
N	REV. PER ECN 6938 SH	12/7/72
M	REDRAWN	7-21-72

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	BLP	6-21-72
.XX ± .01	CHK		
.XXX ± .005	ENGR		
ANG. ± 1°	APVD		

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Laguna Beach, California 92652
Tel: 714 494-9401 • TWX: 910 596-1320

TITLE ASSY MODULE OCTAVE OSC. 450-1K MHZ

SH 1 OF 2	SIZE	DWG NO	REV
REL	A	95-0279-01	

A-5415
B-5458
C-5586A
D-5965
E-5982
F-6074
G-6101
H-6104

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	B95-0280-01H	1	PCB Assembly	
2				
3				
4	02-7004-04	16	Screw, P.H., #4-40 x 1/4	
5	02-7204-04	9	Screw, FilHd., #4-40 x 1/4	
6	03-1033-01	9	Lockwasher #4 Split	
7	03-1028-01	16	Lockwasher, INT. #4	
8				
9				
10	A09-0731-01	1	RFI Gasket Mat'l (Ft.)	
11				
12				
13	03-1548-01	2	Standoff, #4-40	
14				
15				
16	14-0681-01	1	End Plate, Blank	
17	14-9022-01	1	End Plate, Special	
18				
19	A15-0205-03	1	Module Case, Half	
20	A15-0245-03	1	Housing, Module-Modified	
21				
22	B21-0020-01	7	CFCF, 120 pF	C28-34
23	23-0036-01	1	CTCT, .5-3 pF	C1
24				
25	26-1522-01	1	RFC, 100Ω, ±10%, 1/4W	R5
26				
27				
28	44-0078-01	1	R.F. Jack	J1
29				
30				
31	43-0082-01	1	Strap	
32				
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Figure 5-17B

	NAME	DATE
BY	KH	10/19/70
CHK	S.T.G.	11/30/70
ENG	CRW(ERN-551 REL 11/30/70	

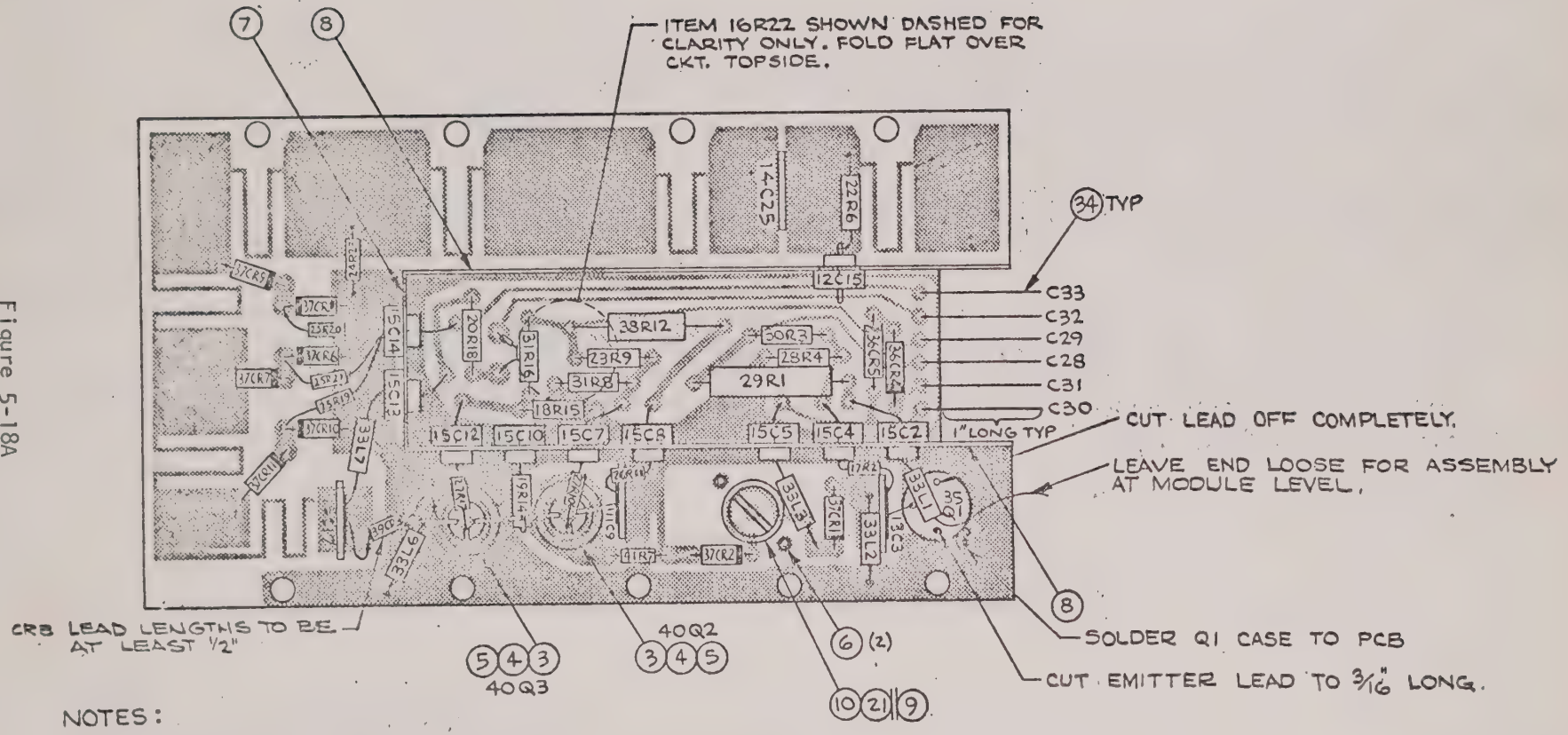
TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 494-9401 • TWX 910 596-1320

PARTS LIST

REL	SH 2 OF 2
A	95-0279-01
REV	D

TITLE: ASSEMBLY, MODULE, OCTAVE OSCILLATOR, 450-1000 MHz

95-0279-01



NOTES:

1. SHIELDS MUST BE PERPENDICULAR TO PCB AND PUSHED DOWN FULLY INTO SLOTS BEFORE SOLDERING.
2. SOLDER SHIELD TO PCB AT ALL APPLICABLE INTERSECTIONS, .100 MAX OVERFLOW.
3. USE ITEM #2 ON LEADLESS DISKS ONLY.
4. SEE SCHEMATIC NO 854-0279-01.

telonic	TELONIC INDUSTRIES		ASSEMBLY, P.C.B., 450-1000 MHz OSCILLATOR			
TOLERANCES		AQL.				
FRACT. ± 1/32	.XX ± .01	SCALE 2/1	SH 1 OF 2	SIZE	DWG NO.	REV
ANG ± 1°	.XXX ± .005		REL.	B	95-0260-01	N

Figure 5-18A

A-5413
B-5458
C-5608
D-5647
E-5940
F-5982

J-7001
L-Skinny
M-7123

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	57-0171-03	1	P.C. Board	PCB-1
2	01-0403-01	A/R	Solder, 2% Silver	See sht.1,note 3
3	03-0194-01	2	Washer, Mica	
4	03-1033-01	2	Lockwasher, #4, Spring	
5	03-1523-01	2	Nut, Hex, #4-40	
6	09-0064-01	2	Eyelet, .059 dia. x 7/32	
7	A15-9008-01	1	Shield	
8	A15-9007-01	2	Shield	
9	14-9023-01	1	Block, Nylon	
10	02-9000-01	1	Screw, Adjust	
11	21-0009-01	1	CFD, 470 pF, solder-in	C9
12	B21-0020-01	1	CFCF, 120 pF	C15
13	A21-0038-01	1	CFD, 20 pF, solder-in	C3
14	21-0045-01	2	CFD, 100 pF, solder-in	C17,25
15	21-0046-01	9	CFCF, 120 pF, hollow	C2,4,5,7,8,10,12-
16	25-0016-01	1	RVV	R22
17	26-3001-01	1	RFC, 1kΩ, ±10%, 1/8W	R2
18	27-0253-09	1	RFMF, 2.1kΩ, ±1%, 1/4W	R15
19	26-1501-01	1	RFC, 220Ω, ±10%, 1/4W	R14
20	26-1530-01	1	RFC, 47Ω, ±10%, 1/4W	R18
21	03-0195-01	1	Washer, Teflon	
22	26-1528-01	1	RFC, 1kΩ, ±10%, 1/4W	R6
23	27-0253-02	1	RFMF, 1.21kΩ, ±1%, 1/4W	R9
24	26-1594-01	1	RFC, 10kΩ, ±10%, 1/4W	R23
25	26-3002-01	3	RFC, 10kΩ, ±10%, 1/8W	R19-21
26	26-3007-01	1	RFC, 10Ω, ±10%, 1/8W	R11
27	26-3014-01	2	RFC, 220Ω, ±10%, 1/8W	R10,17
28	27-0105-01	1	RFMF, 1.3kΩ, ±1%, 1/4W	R4
29	27-0227-01	1	RFMF, 274Ω, ±1%, 1W	R1
30	27-0253-90	1	RFMF, 4.02kΩ, ±1%, 1/4W	R3
31	27-0253-91	2	RFMF, 2.74kΩ, ±1%, 1/4W	R8,16
32	00-1070-01	1	Tubing, Teflon	
33	32-0040-01	5	IF, .47 µH	L1-3,6,7
34	43-0043-01	1	Wire, #22 Buss	L4
35	A40-0085-01	1	TR, A210	Q1
36	41-0022-01	2	DS, IN 3064	CR4,5
37	41-0112-01	8	DSV, MV 3140	CR1,2,6-11
38	27-0250-96	1	RFMF, 154Ω, ±1%, 1/2W	R12
39	41-0115-01	1	DS, HPA 5082-3080	CR3
40	A97-9494-03	2	Assembly, Transistor	Q2,3
41	26-3006-01	1	RFC, 22Ω, ±10%, 1/8W	R7
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	NAME	DATE
APVD		
ENG		
CHK		
BY	KH	9/14/71

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21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 494-9401 • TWX: 910 596-1320

PARTS LIST

TITLE: ASSEMBLY, PCB, OSCILLATOR, 450-1000 MHz

SIZE	DWG NO	REV
A	95-0280-01	N

REL ERN 551

SH 2 OF 2

Figure 5-18B

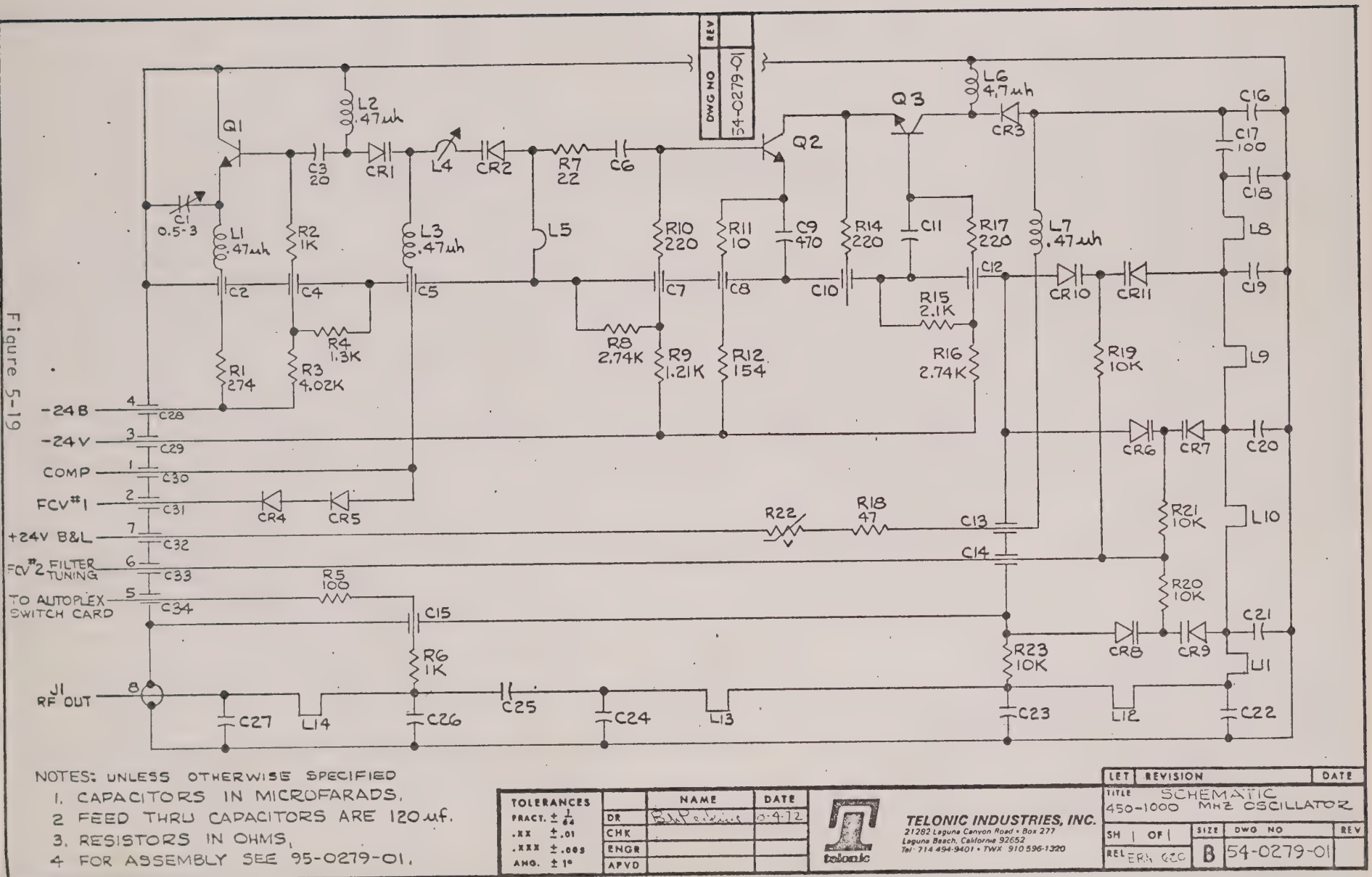

Figure 5-19

NOTES: UNLESS OTHERWISE SPECIFIED
1. CAPACITORS IN MICROFARADS.
2. FEED THRU CAPACITORS ARE 120 uf.
3. RESISTORS IN OHMS,
4. FOR ASSEMBLY SEE 95-0279-01.

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	B.W. Peters	8-4-72
.XX ±.01	CHK		
.XXX ±.005	ENGR		
ANG. ± 1°	APVD		

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LET	REVISION	DATE

TITLE SCHEMATIC 450-1000 MHZ OSCILLATOR

SH 1 OF 1	SIZE	DWG NO	REV
REL ERN 620	B	54-0279-01	

807-6037-01

1. INSERT 3" ITEM 10 INTO BOTH CENTER SLOTS OF EACH CASE HALF TO WITHIN 1/4" OF CONNECTOR END.
2. ASSEMBLE PCB, BOTTOM CASE HALF AND END PLATES.
3. SOLDER PCB SHIELDS TO END PLATE.
4. SOLDER CONNECTOR PIN TO THE PCB.
5. WIRE FEEDTHRUS TO PCB.
6. ASSEMBLE TOP CASE HALF.
7. SEE SCHEMATIC NO. 54-0208-01.

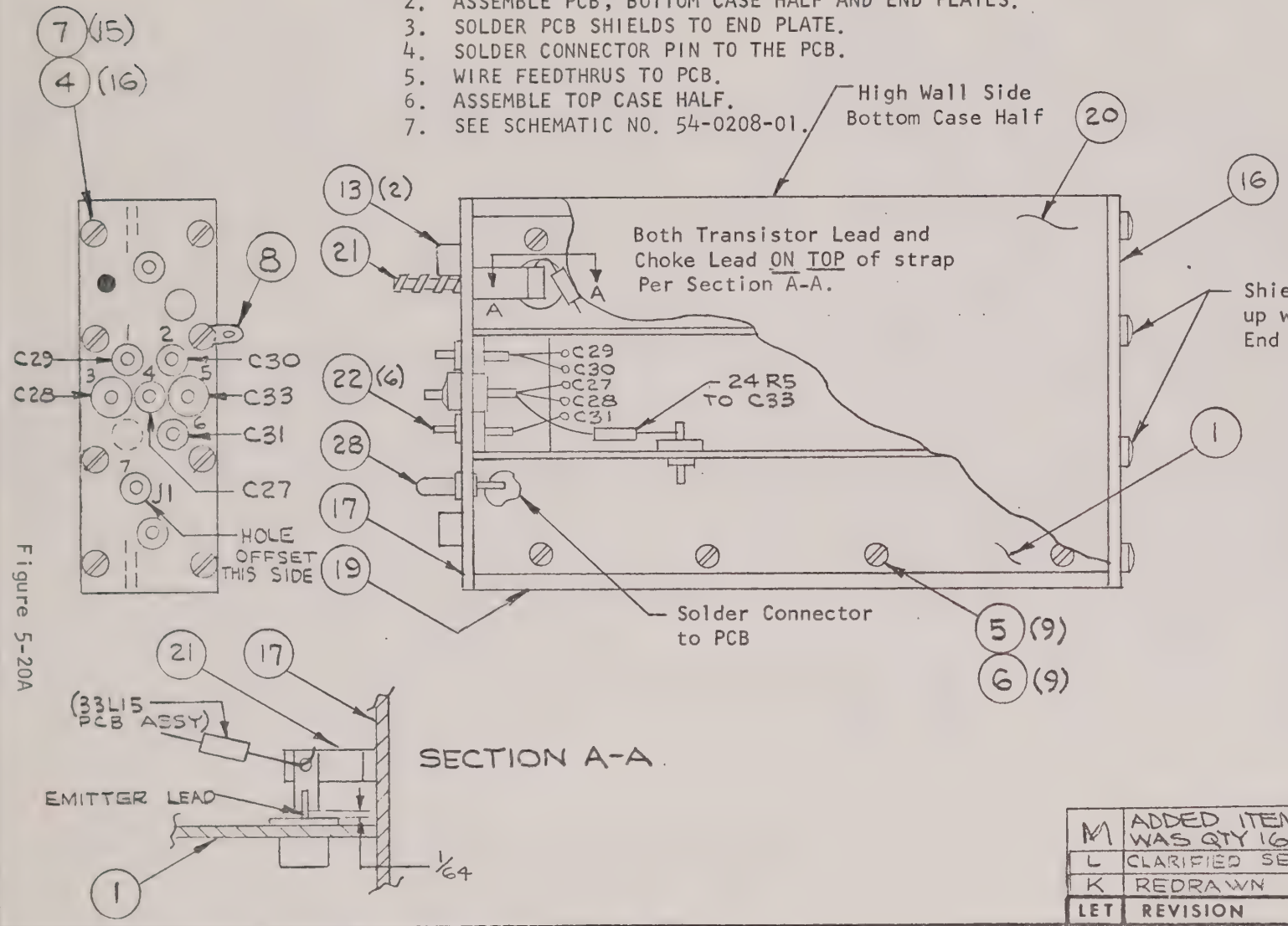

Figure 5-20A

SECTION A-A

LET	REVISION	DATE
M	ADDED ITEM 8, ITEM 7 WAS QTY 16 ECN 7216	1-23-73 DS
L	CLARIFIED SECT AA #7186	12-29-72
K	REDRAWN BWP	7-31-72

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	TPR	8/1/72
.XX ±.01	CHK	[illegible]	8-3-72
.XXX ±.005	ENGR		
ANG. ± 1°	APVD		

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TITLE			
ASSY. MODULE, OCTAVE OSCILLATOR, 900-1600 MHz			
SH 1 OF 2	SIZE	DWG NO	REV
REL	A	95-0281-01	M

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	95-0282-01	1	P.C.B. Assembly	
2				
3				
4	02-7004-04	16	Screw, PH #4-40 x 1/4	
5	02-7204-04	9	Screw, FH #4-40 x 1/4	
6	03-1033-01	9	Lockwasher #4 Split	
7	03-1028-01	15	Lockwasher Ext. #4	
8	09-0096-01	1	Lug, Solder	
9				
10				
11	09-0731-01	1	RFI Gasket Material	
12				
13	03-1548-01	2	Standoff #4-40	
14				
15				
16	14-0681-01	1	End Plate Blank	
17	14-9022-01	1	End Plate Special	
18				
19	15-0205-03	2	Module Case, Half	
20				
21	96-0001-01	1	Trimmer F/F 23-0036-01	
22	21-0020-01	6	CFCF 120pF	C27-31,33
23				
24	26-1503-01	1	RFC 470Ω ±10% 1/4W	R5
25				
26				
27				
28	44-0078-01	1	R.F. Jack	J1
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Figure 5-20B

	NAME	DATE
BY	TPR retyped	1/23/73
CHK	STEADMAN	1/23/73
ENG		
APVD		1/23/73

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PARTS LIST

TITLE: ASSEMBLY, MODULE, 900-1600 MHz OSCILLATOR

REL	SH 2 OF 2	SIZE	DWG NO	REV
		A	95-0281-01	M

95-0281-01

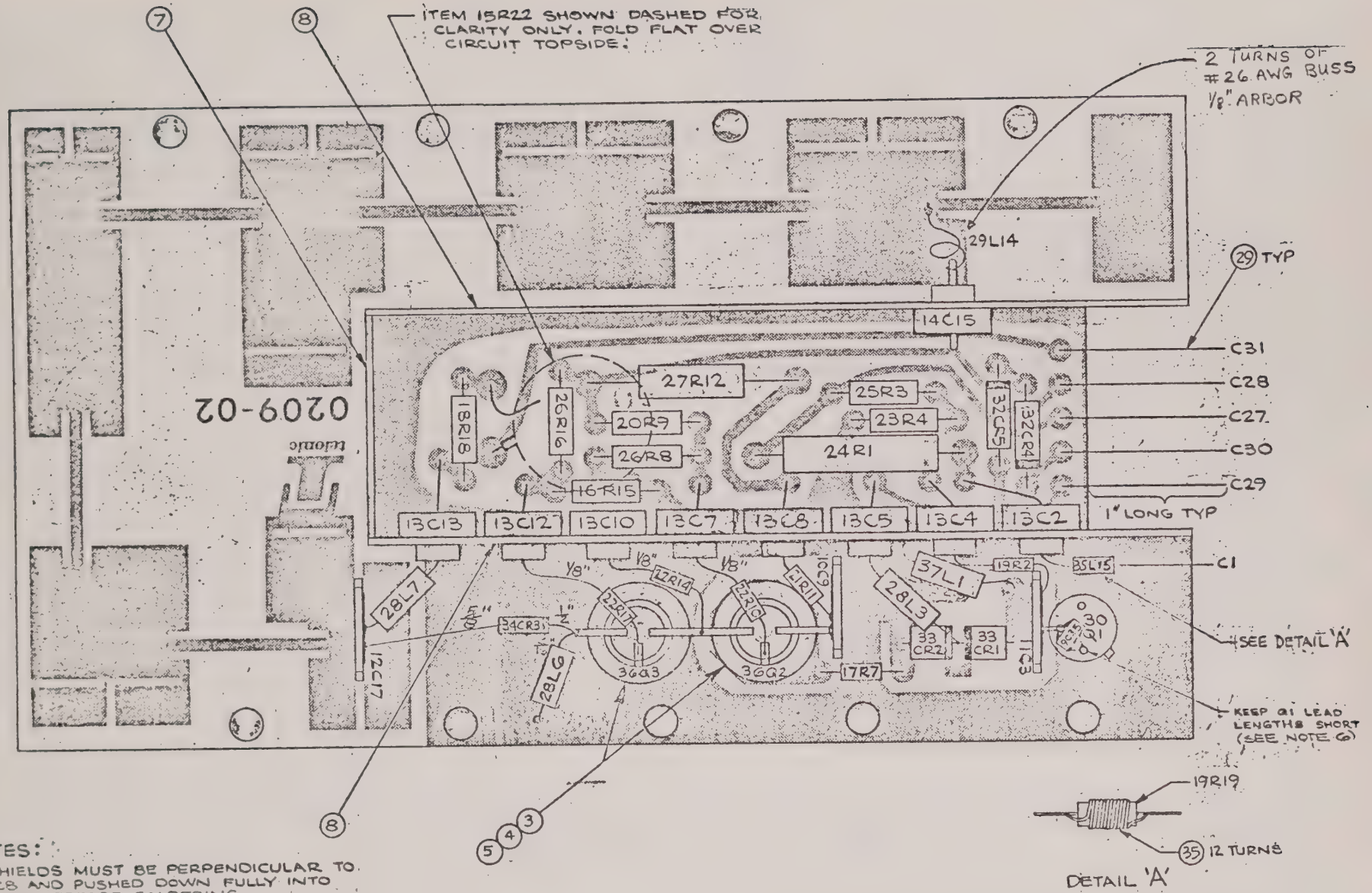

Figure 5-21A

NOTES:

1. SHIELDS MUST BE PERPENDICULAR TO PCB AND PUSHED DOWN FULLY INTO SLOTS BEFORE SOLDERING.
2. SOLDER SHIELD TO PCB AT ALL APPLICABLE INTERSECTIONS, .100 MAX OVERFLOW.
3. 29L14 IS 1.00 INCH LONG.
4. USE ITEM #2 ON LEADLESS DISKS ONLY.
5. SOLDER ITEM 37L1 NEAR TOP OF SHIELD, KEEP AWAY FROM PCB.
6. 9C35 IS STOOD ON IT'S SIDE AND SOLDERED BETWEEN THE BASE AND EMITTER LEADS OF Q1.

telonic	TELONIC INDUSTRIES		ASSEMBLY - PCB, OSCILLATOR, 900-1600MHz				
TOLERANCES		AGL					
FRACT ± 1/64	.XX ± .01	SCALE 4/1	REVISIONS	SHEET 1 OF 2	C	DRAWING NUMBER 95-0282-01	T
ANG ± 1°	.XXX ± .005						

H-6550
K-6548
L-6595
M-6716
N-6631
P-6810
R-6112
T-6134

ITEM	PART NUMBER	QTY -01	DESCRIPTION	CKT REF
1	57-0209-02	1	P.C.Board	PCB1
2	01-0403-01	AR	Solder,2% Silver	See Sh.1,Note 4
3	03-0195-01	2	Washer, Mica	
4	03-1033-01	2	Lockwasher,#4,Spring	
5	03-1523-01	2	Hex Nut, #4-40	
6				
7	A15-9008-01	1	Shield	
8	A15-9007-01	2	Shield	
9	21-0048-01	1	CF,Solder-In, 0.5pF	C35
10	21-0009-01	1	CF, Solder-In,470pF	C9
11	A21-0038-01	1	CF,Solder-In,20pF	C3
12	21-0045-01	1	CF,Solder-In,100pF	C17
13	21-0046-01	8	CFCF,120pF,Hollow	C2,4,5,7,8,10,12,13
14	B21-0020-01	1	CFCF,120pF	C15
15	25-0016-01	1	RVV	R22
16	27-0253-09	1	RFMF,2.1k,±1%,1/4W	R15
17	26-1583-06	1	RFC 10 Ω ±10% 1/4W	R7
18	26-1530-01	1	RFC,47Ω,±10%,1/4W	R18
19	26-3001-01	2	RFC,1k,±10%,1/8W	R2,19
20	27-0253-02	1	RFMF,1.21k,±1%,1/4W	R9
21	26-3007-01	1	RFC,10Ω,±10%,1/8W	R11
22	26-3014-01	3	RFC,220Ω,±10%,1/8W	R10,17,14
23	27-0105-01	1	RFMF,1.3k,±1%,1/4W	R4
24	27-0227-01	1	RFMF,274Ω,±1%,1/4W	R1
25	27-0253-90	1	RFMF,4.02k,±1%,1/4W	R3
26	27-0253-91	2	RFMF,2.74k,±1%,1/4W	R8,16
27	27-0250-96	1	RFMF,154Ω,±1%,1/2W	R12
28	32-0040-01	3	IF,.47µH	L3,6,7
29	43-0075-01	1	Wire,Buss #26 AWG	
30	40-0092-01	1	TR,MT 1060	Q1
31				
32	41-0022-01	2	DS,1N3064	CR4,5
33	41-0112-01	2	DSV,MV3140	CR1,2
34	41-0115-01	1	DS,HPA 5082-3080	CR3
35	43-0091-14	AR	IF,12 Turn #36Ga.	L15
36	A97-9494-03A	2	TR Assembly	Q2,3
37	32-0027-01	1	IF, 1.0µh	L1
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59			Figure 5-21B	
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APVD | ENG | CHK | BY

NAME: TPR

DATE: 4/3/72

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PARTS LIST

TITLE: ASSEMBLY,P.C.B.,OSCILLATOR, 900-1600 MHz

REL	SH	SIZE	DWG NO	REV
	2 OF 2	A	95-0282-01	T

95-0282-01

07-0005-01

REV	E
DWG NO	54-0281-01

C	REDRAWN	9-27
D	ADD C35 ECN6548	6/9/72
E	R7 WAS 10Ω ECN 6631	7/17/72

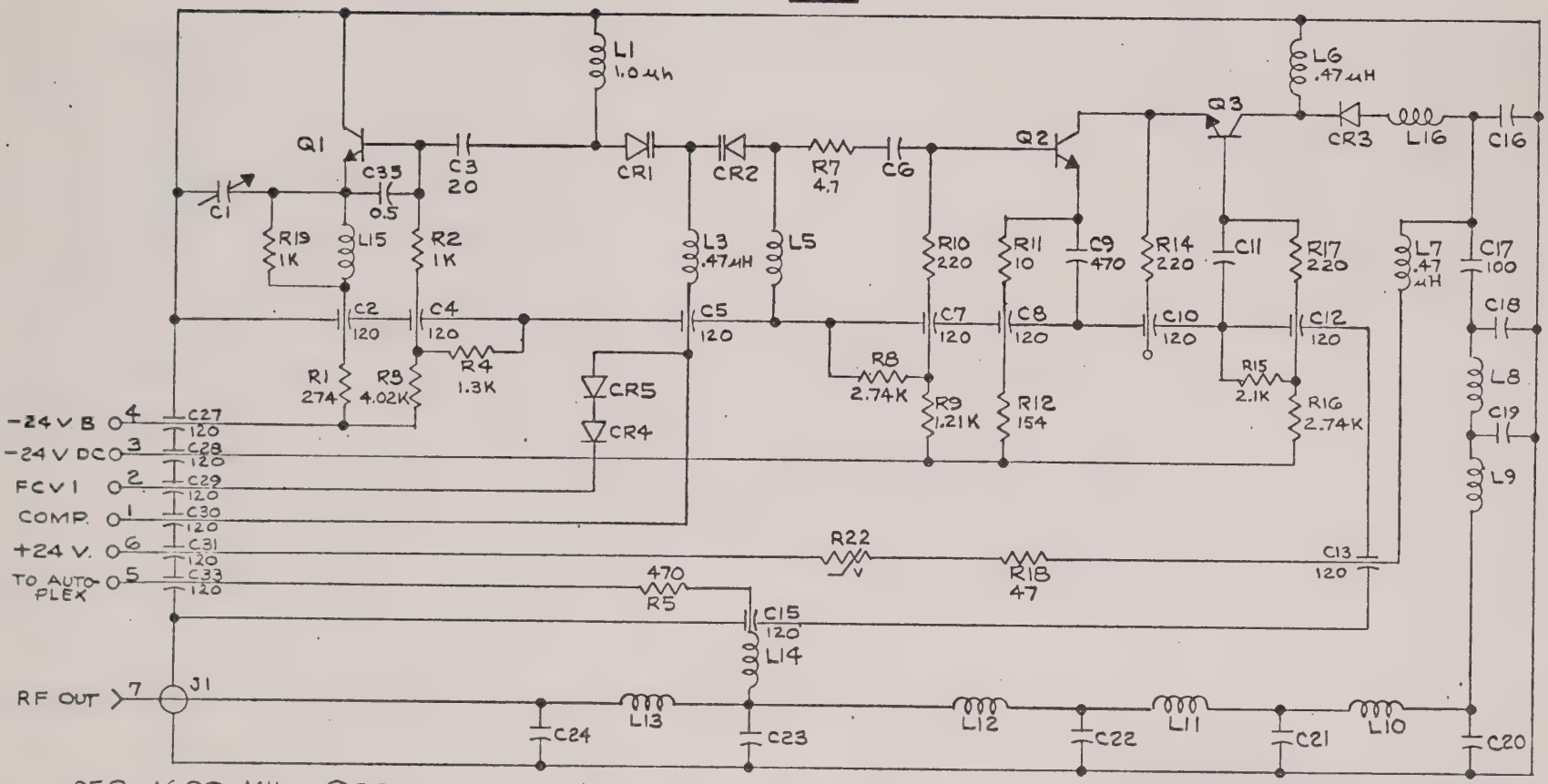

Figure 5-22

950-1600 MHz OSC.

SCHEMATIC 854-0281-01
ASSEMBLY 95-0281-01

NOTES: UNLESS OTHERWISE SPECIFIED
1. CAPACITOR VALUES IN PICOFARADS.
2. RESISTOR VALUES IN OHMS.

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	Bill Parker	9-27-71
.XX ±.01	CHK		
.XXX ±.005	ENGR		
ANG. ± 1°	APVD		

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LET	REVISION	DATE

TITLE			
950-1600 MHz OSC.			
SH 1 OF 1	SIZE	DWG NO	REV
REL	B	54-0281-01	E

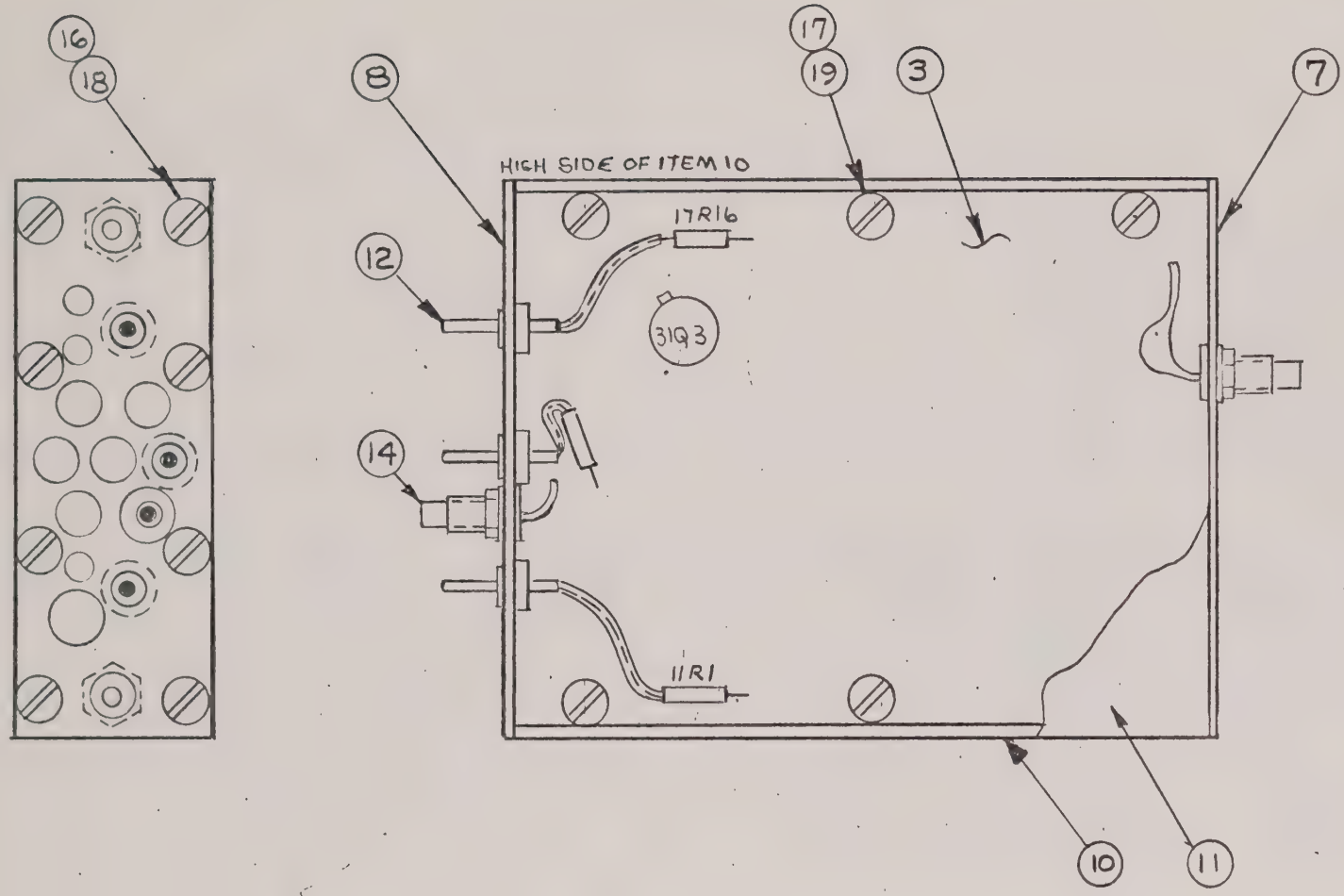

Figure 5-23A

	B	REVISED PER ECN 6931	11/20/72
	A	REVISED PER ECN 6621	7/14/72

	NAME	DATE
BY	B. Perkins	5-25-72
CHK		
ENG	JSH	5/25
APVD		

telonic™

PARTS LIST

TELONIC INDUSTRIES, INC.
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TITLE	ASSY - MODULE 1-500 MHz AMPL		
SH 1 OF 2		SIZE	DWG NO
REL		A	95-0305-01

A- ECN 6621

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1				
2				
3	95-0304-01	1	PCB Assy	
4				
5				
6				
7	14-0681-02	1	End Plate	
8	14-9022-01	1	Plate, End - Bottom	
9				
10	15-0205-06	1	Cover, Module, Bottom	
11	15-0260-01	1	Cover, Module, Top	
12	21-0016-01	3	CFCF, 1000 pF	C11,-13
13				
14	44-0078-01	2	Connector	
15				
16	02-7004-04	16	Screw, #4-40 x 1/4 PHMX	
17	02-7204-03	6	Screw, #4-40 x 3/16 FHMX	
18	03-1028-01	16	Lockwasher, #4 Int	
19	03-1033-01	6	Lockwasher, #4 Spring	
20				
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	NAME	DATE
BY		
CHK		
ENG		
APVD	TPR	5/16/72

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PARTS LIST

TITLE MODULE, 1-500 MHz AMPLIFIER

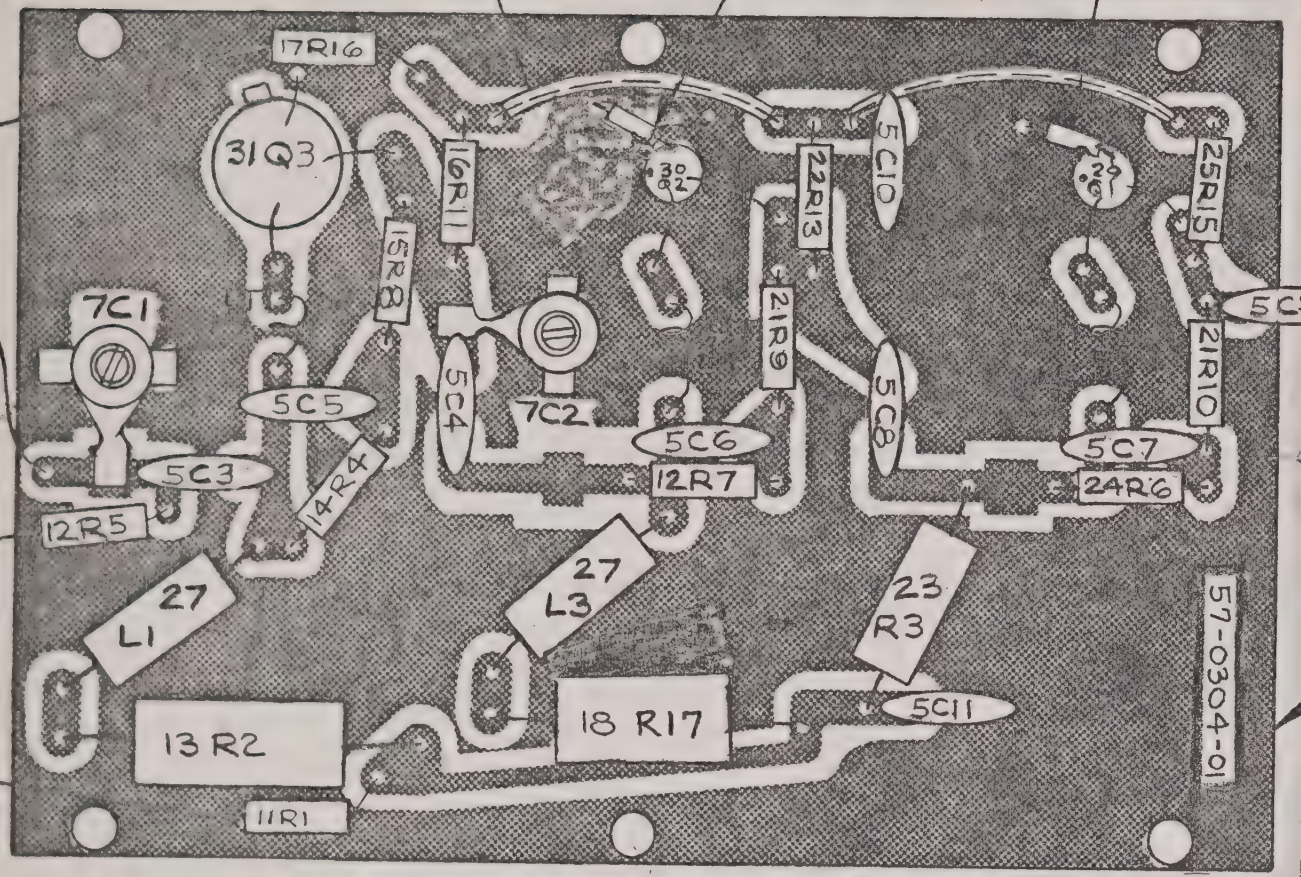
SIZE	DWG NO	REV
A	95-0305-01	A

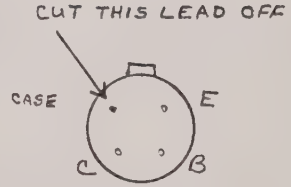
SH 2 OF 2

REL

Figure 5-23B

95-0305-01





DETAIL OF Q1 AND Q2
(BOTTOM VIEW)

NOTES:
1. For Schematic see 54-0305-01
2. Coils, Item 43, on 1/8 Arbor tight full wound.
3. Solder only the tab of each transistor to the PCB.
4. The leads of each transistor shall be as short as possible.
5. Cut the case lead off of items 30 and 29 (see detail).

LET	REVISION	DATE
F	REV. ECN 6920 JH	11/7/72
E	REV. SHT. 2 ECN 6902 JH	11/7/72
D	REV. P/L ECN 7060	9/1/72
C	C5-11 WERE .01 #6676	8-22-72
B	REV. PER ECN 6721 JH	7-19-72
A	REVISED PER ECN 6608	7/10/72

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	P. MARX	3/15/72
.XX ±.01	CHK		
.XXX ±.005	ENGR		
ANG. ±1°	APVD		

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TITLE			
PCB ASSEMBLY 1-500 MHZ AMPLIFIER			
SH 1 OF 2	SIZE	DWG NO	REV
REL	A	95-0304-01	F

07-6017-01

95-0304-01

A-No Change
C-6676
D-7060
E-6902

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	57-0304-01	1	PCB	
2				
3	00-1070-01	A/R	Sleeving	
4				
5	22-0202-01	9	CFD, 0.1μF, 50 V.	C3-C11
6				
7	23-0045-02	2	CTCD, 1.7-10 pF	C1, 2
8				
9				
10				
11	26-4010-05	1	RFC, 10Ω, 1/4W, 5%	R1
12	26-1519-01	2	RFC, 1k, 1/4W, 5%	R5,7
13	28-0084-01	1	RFC, 200Ω, 2W, 5%	R2
14	26-1578-01	1	RFC, 680Ω, 1/4W, 5%	R4
15	26-1559-01	1	RFC, 180Ω, 1/4W, 5%	R8
16	26-1562-01	1	RFC, 3.3k, 1/4W, 5%	R11
17	26-1572-01	1	RFC, 22Ω, 1/4W, 5%	R16
18	28-0143-01	1	RFC, 470Ω, 1W, 5%	R17
19				
20	26-3007-01	2	RFC, 10Ω, 1/8W, 10%	R12,14
21	26-1560-01	2	RFC, 270Ω, 1/4W, 5%	R9,10
22	26-1580-01	1	RFC, 5.6k, 1/4W, 5%	R13
23	26-0057-01	1	RFC, 750Ω, 1/2W, 5%	R3
24	26-1553-01	1	RFC, 2.2k, 1/4W, 5%	R6
25	26-1520-01	1	RFC, 8.2k, 1/4W, 5%	R15
26				
27	32-0019-01	2	IF, 10μH	L1,L3
28				
29	40-0108-01	1	TR A485	Q1
30	40-0084-01	1	TR A430	Q2
31	40-0068-01	1	TR 2N5109	Q3
32				
33				
34	43-0086-01	A/R	Buss Wire #24	L2,4,5
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Figure 5-24B

APVD		
ENG		
CHK		
BY	NAME	DATE
	TPR	3/17/72

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21282 Laguna Canyon Road • Box 277
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PARTS LIST

REL	SH 2 OF 2	TITLE	PCB ASSY, 1-500 MHz AMPLIFIER
	SIZE A	DWG NO	95-0304-01
		REV	E

95-0304-01

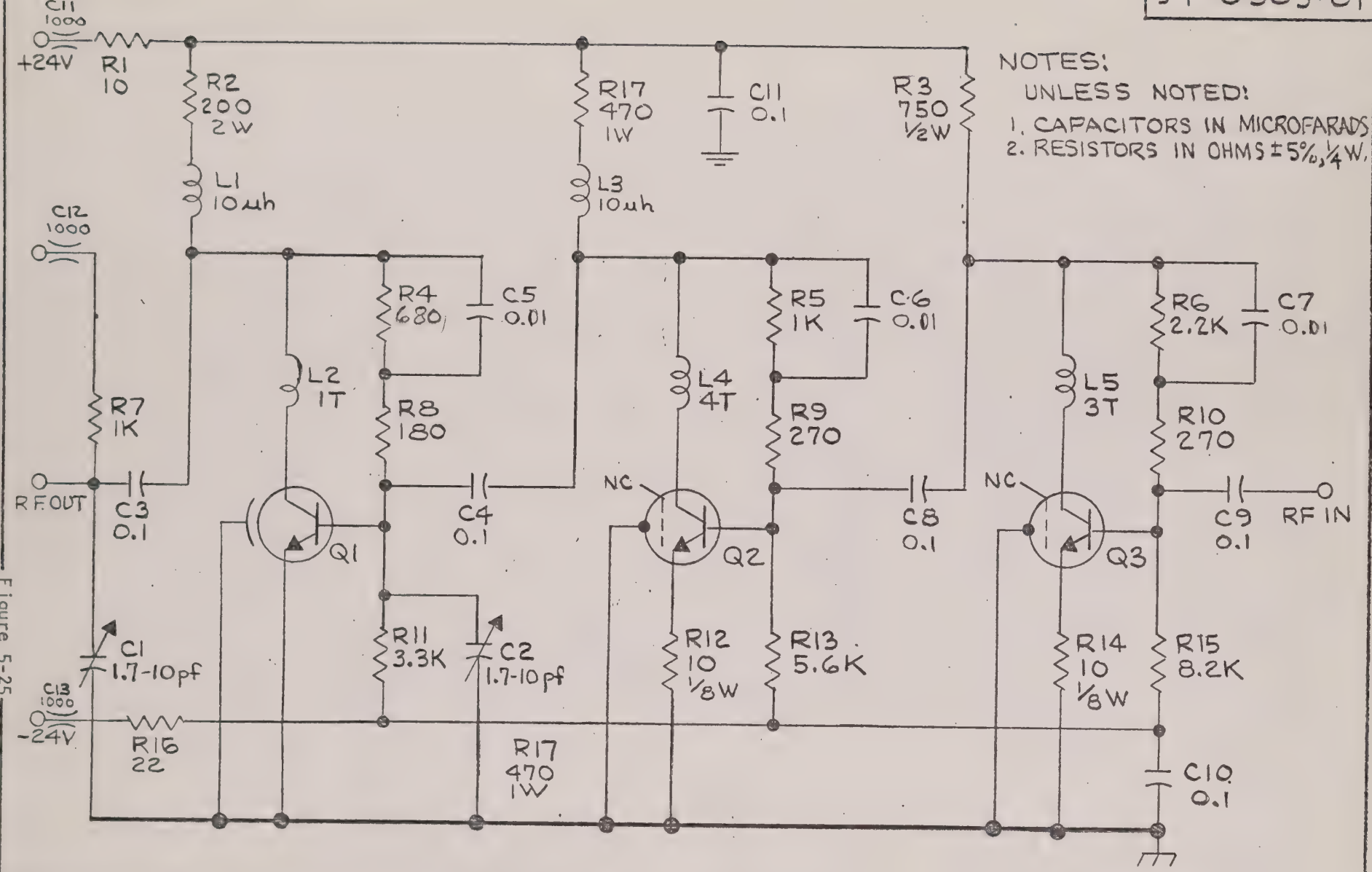

Figure 5-25

	NAME	DATE
BY	Bill Perkins	5-25-72
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ENG	[illegible]	5/25
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TITLE SCHEMATIC
1-500 MHZ AMPL

SH 1 OF 1 | REL

SIZE A | DWG NO 54-0305-01

6.0 TROUBLE SHOOTING

6.1 General

The following section outlines, in brief detail, some general techniques and areas of examination related to specific types of failures which may be encountered with the Model 1205. Specific areas of failure will be discussed, and information related to repairing the failure presented. It is anticipated that this section will be used in conjunction with Sections 3.0, 4.0 and 5.0 in order to obtain schematic references, operational theories, and general information.

6.2 Nature of Failure

6.2.1 Total Inoperation

Total inoperation is experienced when there is NO RF output, NO marker operation, and NO ramp generation. Proceed as follows:

A. Examine Pilot Light	If pilot light is NOT glowing, check line fuse and prime power source. If pilot light IS glowing, see (B) below.
B. Power Supply	Check for the presence of +24V and -24V (See Figure 4-1 for location of measurement points). An absence or irregularity of BOTH voltages indicates a probable failure of the +24V circuitry; an absence of -24V only indicates a failure of the -24V circuitry. Note the condition of resistors R1 and R21 - these are subject to failure in the event of an excessive current drain from either supply.

6.2.2 RF Output and Sweep Failures

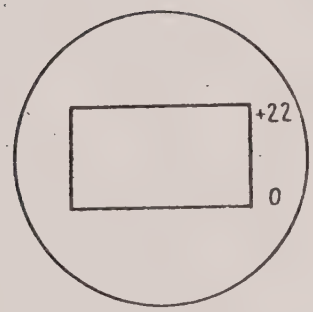
NOTE: All waveforms taken with scope Horiz output connected to X input of oscilloscope.

A. Lack of sweep

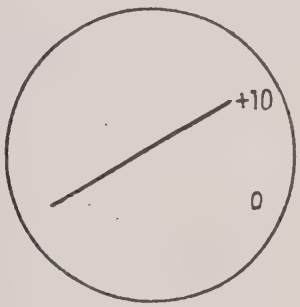
Make sure the INT/EXT switch is in INT. Refer to Section 3.2.3 for a description of the operation of the ramp generator circuitry.

The following are waveforms normally appearing at the indicated test points; the conditions are:

INT/EXT Switch	INT
VAR/LINE Switch	VAR
SWEEP RATE Control	Mid-range



TP-5



TP-9 (Also TP-3)

TP-5 is a switched waveform providing drive to the integrator input and blanking control transistor.

TP-9 is the integrator output (identical in shape to the HORIZ DRIVE output waveform at the front panel. This waveform is also present at TP-3 in the INT mode.

Figure 6-1

Ramp Generator Waveforms (Typical)

See Figures 5-4A & B for Location of Test Points

B. Insufficient RF on ALL bands

Check attenuator detector, RF output connector, and interconnecting cabling.

Check Blanking. (See Item 6.2.2-1)

Remove bottom cover and determine the presence of -24V (harness reference F) at the RF modules (See Figure 5-2A)

Check or replace the R.D.M.C., Assy No. 95-0259-01.

C. Insufficient RF on band 1 only

Check voltages on the 1-500 RF Amp. The waveform at pin H (Figure 5-2A) should be a square wave at the sweep rate varying between +3 and -24V nominally. If not, check front panel switching circuitry.

Check cabling at the top and bottom of the 1-500 module.

Check or replace 1-500MHz amplifier.

Check or replace R.D.M.C.

D. Insufficient RF on bands 1 and 2

Check voltages on the 450-1000 oscillator. The voltage appearing at harness reference 1 should be a +3 to -24V square wave in band 2, a positive DC level in band 1. See waveforms at TP6 and TP7 (Figure 6-2) for waveforms at points O and A (Figure 5-2A), band 2 only.

Check interconnecting cabling from 450-1000 MHz oscillator.

Check 450-1000 MHz oscillator.

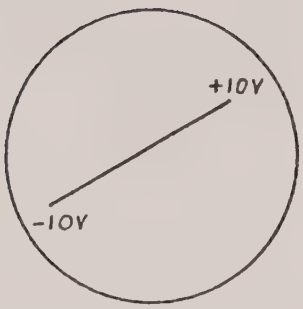
E. Absence of RF on bands 1 and 3

Check voltages appearing on 900-1600 MHz oscillator module. The voltage at point K (Figure 5-2A), band 3 only, should be a +3 to -24V square wave. See Figure 6-3 for waveform appearing at pin B (Figure 5-2A) and TP-4.

Check interconnecting cabling from the 900-1600 MHz oscillator.

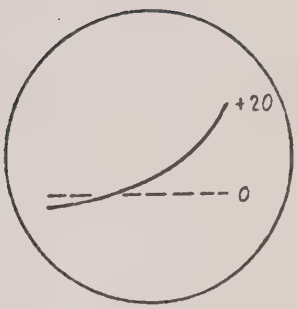
Check 900-1600 MHz oscillator.

NOTE: Band 1 output is formed by mixing RF from the band 2 and the band 3 oscillators in the R.D.M.C. and amplifying the result. It is extremely unlikely that RF would be present on band 1 and absent on either band 2 or band 3.



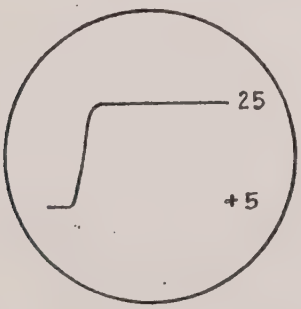
TP-2

TP-2 is the output of the center frequency and sweep width combiner circuitry which drives both the high and the low linearity circuits. This is a function of the front panel sweep width and center frequency controls and is coupled to the low linearity driver through the front panel band switch.



TP-7

This voltage is the voltage applied to the 450-1000 MHz oscillator in order to generate the RF sweep. It should appear at TP-7 AND at point A (Figure 5-2A of the RF section harness when the band switch is in the band 2 position.



TP-6

Varactor drive waveform to the output filter of the 450-1000 MHz oscillator. This waveform should appear at TP-6 AND at point D of the RF section harness (Figure 5-2A) when in the band 2 position.

Figure 6-2. 450-1000 MHz Oscillator Typical Drive Waveforms. (See Figure 5-4A & B for Test Point Location)

F. Improper RF range on band 2

This defect is usually due to a malfunction of the 450-1000 MHz oscillator drive circuitry. The waveforms as shown should appear at the test points as shown in Figure 6-2 with the following front panel conditions:

BAND SWITCH	Band 2
CENTER FREQ.	750 MHz
SWEEP WIDTH	Max
INT/EXT Switch	INT

If the sweep drive voltages are correct, the defect is in the oscillator module; the module should be replaced.

NOTE: The filter drive waveform, TP-6, has minimal effect on the band 2 range. Harmonic content of the output in the low portion of the band will be severely increased if the filter drive waveform is maladjusted.

G. Improper RF Range on band 3

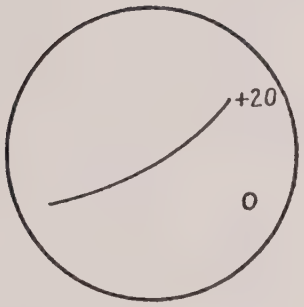
This defect is usually due to a malfunction of the RF drive circuitry of the 900-1600 MHz oscillator module. First with the front panel controls as follows:

BAND SWITCH	Band 3
CENTER FREQ.	1150 MHz
SWEEP WIDTH	Max
INT/EXT Switch	INT

observe the waveform at TP-2 (See Figure 6-2).

Note that the sweep drive waveform is nominally that shown in Figure 6-3 at TP2 and also at the 900-1600 MHz oscillator module.

If the sweep drive voltages are correct, the fault is in the oscillator module; the module should be replaced.



TP-4 Typical Waveform

This voltage is the voltage applied to the 900-1600 MHz oscillator in order to generate the RF sweep. It should appear at TP-4 and also at point B (Figure 5-2A) of the RF section harness when the band switch is in the band 3 position.

Figure 6-3

H. Band 1 RF range improper

In the band 1 mode, the 900-1600 MHz oscillator is driven with the same waveforms that form the band 3 outputs. Determine that the waveform at TP-6 is present as shown in Figure 6-3. The 450-1000 MHz oscillator is driven by a DC voltage present at TP-8; this voltage is nominally +9 VDC.

Check band switch and zero adjust circuitry on front panel PC board.

I. Improper Blanking

Improper blanking - usually lack of blanking - is caused by a defective blank drive transistor (Q1, Figure 5-4A). Additionally, Q3, 4, 9 and 10 of the power supply PC board (Figure 5-6) may be defective and inhibit blanking.

J. Faulty RF Leveling

Check the monitor output to determine operation of the monitor (C3, Figure 5-29).

Check the leveler amplifier and reference, E3 and associated circuitry of the power supply, Figure 5-6.

Ensure the output from the oscillator is set to the specified limit (+7 dBm with 0 dB of attenuation).

Check MAX and MIN level controls on front panel PC board.

6.2.3 Marker Defects

An extender card, Telonic part number 97-0645, is highly recommended.

A. All Markers Inoperative

Check the marker box assembly to determine whether proper voltages are present. This is most easily accomplished by removing ONE marker card, placing in on an extender board (Telonic P/N 97-0645) and measuring the voltages at the base of the card.

Check sweep sample input from monitor to attenuator.

Check the birdy amplifier circuitry, Q10-13 of Figure 5-4B, and associated circuitry; TP-11 is the birdy amplifier output on the card. Check cabling to the front panel.

B. Less than all markers inoperative

Check the card in question using the extender card to determine proper DC voltages.

Check the amplitude control of the marker in question - these controls are located on the front panel PC board.

If the card is found to be defective, first check the crystal oscillator then the mixer stages, finally the amplifier on the card. Each marker is of the basic block diagram shown in Figure 6-4; the individual circuitry is shown in the 8015 and 8020 schematics.

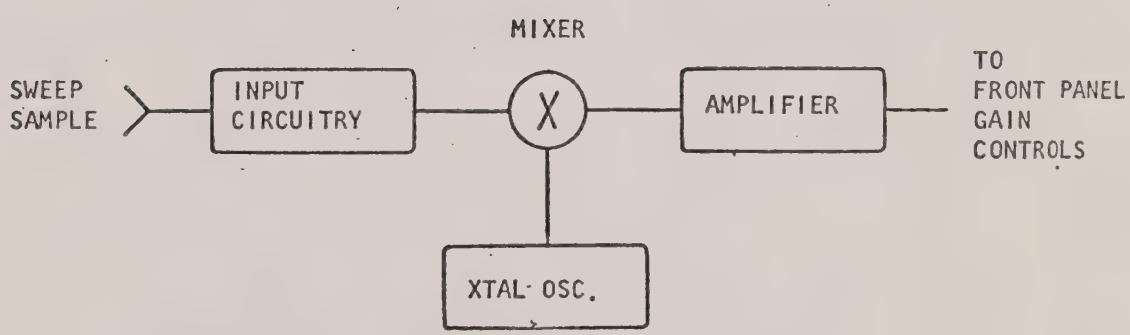


Figure 6-4

WARRANTY

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All customer returns require authorization from Telonic Industries, Inc. prior to shipment of equipment. Any equipment returned without authorization for shipment will be at the customer's or distributor's expense.

Instructions for Returning Equipment To Telonic:

1. Contact factory with details of part number, serial number, original purchase order number and reason for return.

2. Telonic will issue instructions on returning the material to the factory or to our regional repair facility. "Please do not return instruments or parts before receiving directions." This will assure you the fastest possible service on Telonic products.

3. Customer is expected to ship all returns prepaid freight. Material will be returned via same shipping method as received unless otherwise instructed.

Units will be shipped "Prepaid"....In Warranty and
"Collect"....Out of Warranty.

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